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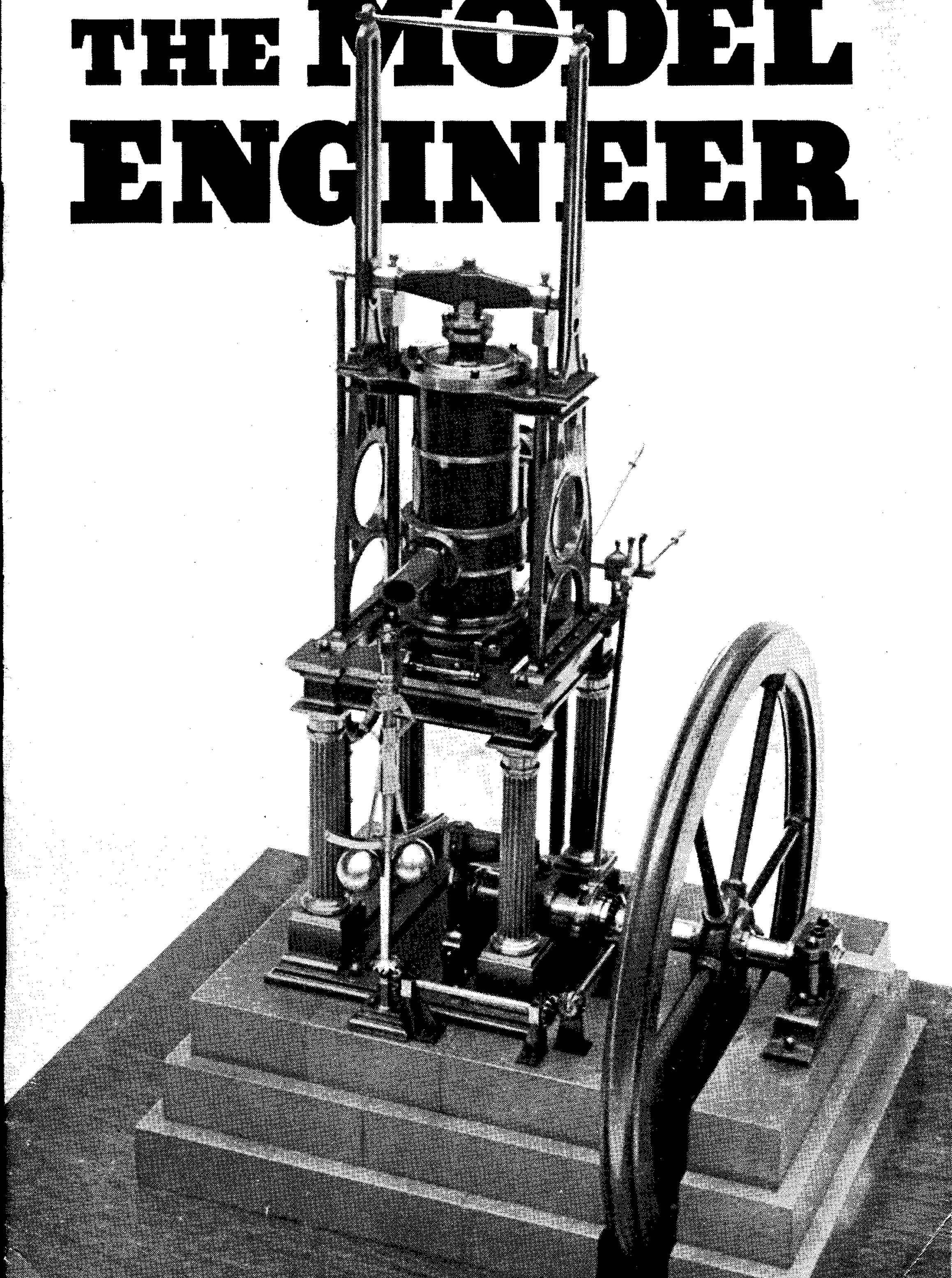
THE MODEL ENGINEER



The MODEL ENGINEER

PERCIVAL MARSHALL & CO. LTD., 23, GREAT QUEEN ST., LONDON, W.C.2

8TH MAY 1952 VOL. 106 NO. 2659

SMOKE RINGS

Our Cover Picture

● STEAM ENTHUSIASTS will find much to praise in the splendid model shown on our cover this week.

The work of Mr. R. W. Wood, an experimental mechanic from Leeds, the model represents a type of high-pressure steam table-engine in use over a hundred years ago, and is from a prototype by Murdoch, Aitken & Co., of Glasgow.

Note should be taken of the proportions of the various components, and, not quite so evident in the photograph, the very realistic scale finish. Indeed, it is not difficult to see why it won the cup in its class at the recent Northern Models Exhibition at Manchester.

On other pages in this issue, our contributor, "Northerner," gives an illustrated and detailed account of the model, which should be good reading for steam enthusiasts.

Light Steam Power Progress

● AT THE annual general meeting of the British Light Steam Power Society held recently in London, good reports were made of the society's progress during the past year. Activities included a good deal of basic research work in the design of an experimental steam car power unit on the most modern lines, and certain of the components had reached the testing stage. It was decided that there should be no premature public disclosure of the design, as a great deal of harm had been done in the past by the publication of experimental designs which, on practical investigation, proved disappointing, or which, for reasons connected with finance, or other causes, were not brought to a successful completion. It was not expected that developments in this field of research would be rapid or spectacular, as they necessarily involved a considerable amount of expense, and also hard work by the members of the society actively engaged upon them.

Apart from this, however, the finances of the society were reported to be very satisfactory. Most of the executive committee and also the technical committee were re-elected *en bloc*, but the honorary secretary, Mr. J. H. Walton, who has played a very important part in the building up of the society during recent years, has been forced, by pressure of business, to retire. His duties, however, are being taken over by Mr. M. Harman Lewis, who is very well-known in the field of light steam power research, and has contributed articles on steam cars to the "M.E." in the past. His address, for readers who may wish to get in touch with the society, is 39, Arundel Avenue, Ewell, Surrey. We take this opportunity of wishing every success to the society in its very worthy aims of improving and promoting interest in the small high-efficiency steam engine, and look forward to being able, in due course, to publish details of the design above referred to, when its development is finally completed.

The Fowler Engine " Supreme "

● ONE OF the best-known road locomotives built by John Fowler & Co. Ltd., of Leeds, is their No. 20223, named *Supreme*. She is a magnificent engine weighing 17 tons, and her chief distinction is that she was the last showman's engine ever to be built by any firm, and a truly noble specimen she is! We are glad to be able to write that statement in the present tense; for this splendid engine still exists and, what is more, looks like lasting for many years to come.

Supreme, which is one of the well-known " Big Lion " class, formerly belonged to Mrs. A. Deakin & Son, amusement caterers, but until very recently, was owned by a firm of haulage contractors in Glasgow. She had done little if any work for some considerable time, and it looked as if her days were numbered, when Mr. John Lyndhurst, of Earnley, Sussex bought her.

That *Supreme* is still in working order is proved by the fact that she made the 450-mile journey from Glasgow to her new home at Earnley by road and under her own steam. This trip was made at an average speed of about 5 m.p.h., and was accomplished in sixteen days, between October 12th and 28th, last.

We should not be surprised if some of the members of the Chichester Model Engineering Society are stirred to the utmost at the thought that so famous an engine is now comfortably housed and cared for so near to them; we hope that they may be able to persuade Mr. Lyndhurst to have *Supreme* on show occasionally. It is a little odd that this engine, after spending all its working life in the north, should now have come almost to the extreme south of England to spend her old age and, let us hope, to permanent preservation.

Hobbies and Handicrafts Exhibition in Norwich

● A HIGHLY successful hobbies and handicrafts exhibition was held for three days in April. It was confined to the Norwich staffs of the Norwich Union Insurance Societies and was organised by the committee of the Norwich Union Staff Social Association.

The number, variety and quality of the exhibits surpassed all expectations. The president and chairman of the societies, Sir Robert Bignold, set an example by exhibiting a magnificent specimen of the bookbinder's art which he had executed in python skin, and the general manager, Mr. W. W. Williamson, showed a sketch-book depicting some fine examples of heraldry.

There were many examples of art, photography and needlework, and of more particular interest to readers of this journal, a representative display of models, woodwork and metalwork. A nearly-completed model of the " Seal " 15-c.c. petrol engine was shown with the head and sump removed. It was driven by a geared-down electric motor and the illuminated contents of the crankcase were visible in a mirror.

Although there is a growing interest in model railways, there was only one exhibit. This was a very well displayed section of " OO " gauge track laid down by the solder-to-pin method, complete with model G.W.R. syphon " G " bogie van to 4-mm. scale.

Ship models were popular, and a nicely-proportioned model of the *Cutty Sark* was awarded the prize for the second-best piece of work in the whole exhibition. There was a well made air-sea rescue launch complete with all the deck details. The model is intended for radio control and when this is fitted it should look most attractive from the pond-side.

Both flying and solid model aircraft were well in evidence and altogether the exhibition was a most encouraging indication of the revival of interest in craftsmanship.

The Sympathetic (?) Customs Official

● IN JANUARY, 1950, we had the pleasure of a visit from Mr. Harry Cook, of San Francisco, California, U.S.A., who had brought with him a 3½-in. gauge " Juliet " which he had then recently finished. We have lately received a long and interesting letter from him, and from it we extract the following story which we think is well worth putting on record. Mr. Cook writes:

" I am now working on the ' Maid of Kent,' which I consider a very good second step from ' Juliet ' which I completed just before I left for England in November, 1950. The latter engine survived the two trans-Atlantic and trans-Continental crossings without mishap.

" The Customs authorities at Southampton did not inspect the engine case or ask any questions, and on arriving at New York I hoped the same good fortune would continue. However, the inspector there decided that, of all our seven suitcases, the engine case was the one to be opened!

" So we grovelled on the concrete floor, unscrewing screws whilst my heart sank at the thoughts of heavy duties to pay. He asked me about the gauge, whether coal- or oil-fired, about the club out in California, my workshop and equipment, while the crowd around us grew, all wanting his services and becoming impatient, too.

" Finally, he said ' O.K.' and when I asked him if he wanted to see the other cases he said ' No! I only wanted to see the engine—I am a model maker myself '."

Two " Howlers "

● MR. T. L. FINLAY, hon. secretary of the Bishop Auckland and District S.M.E.E., has sent us the two following " howlers."

At a recent exhibition, a group of small boys was looking at a model locomotive. One of the party, inspecting the cab fittings, pointed to the pressure gauge and shouted: " Look, this engine has got a speedometer on it."

On another occasion, a 5-in. gauge Pacific locomotive was hauling an outsize load of adults and blowing off at the safety-valves. Among the spectators were a man, connected with the engineering department of a local road transport undertaking, and his schoolboy son. The latter was heard to ask his father what the boiler pressure would be, and received the reply: " Oh, not more than 5 lb., as the boilers are only made of tin." The fact that the boiler had been lagged and covered by sheet tin, and the paint had been scratched, evidently misled him.

A HIGH-PRESSURE TABLE-ENGINE

by "Northerner"

(Photographs by the Author)

WINNER of the First Prize in the "General Engineering Models" section of the Northern Models Exhibition was a beautiful table-engine by Mr. R. W. Wood of Leeds, and those who examined this model closely will agree that it is a veritable masterpiece.

The drawings of the prototype, which was built by Murdoch, Aitken and Co., of Glasgow, in 1842, appear in a book of the period, and perhaps we may whisper that it is hoped to introduce them into the "M.E." series of blueprints in due course. But all in good time!

A photograph of a somewhat similar engine—the Maudslay design—appeared on the cover of THE MODEL ENGINEER for March 13th, 1952, but if the reader cares to compare the two, he will notice many differences in detail. The essentials are the same, however, with the cylinder standing on a table, driving upwards to a cross-head, from the ends of which two return connecting-rods drive down to a crank.

The Murdoch, Aitken design is perhaps the prettier, with its four fluted columns, its classic design of table, and its delicately curved supports and slides. All strictly unnecessary from a functional point of view, of course, and to be deprecated highly from that of a dweller in this streamlined jet and rocket era of progress. Nevertheless, a very pleasant reminder of a more placid period, when 30 p.s.i. and 30 r.p.m. (which are what this engine was designed for!) were considered quite adequate!

The model is built to the same scale as the drawings, which are $\frac{13}{16}$ in. to 1 foot. From the

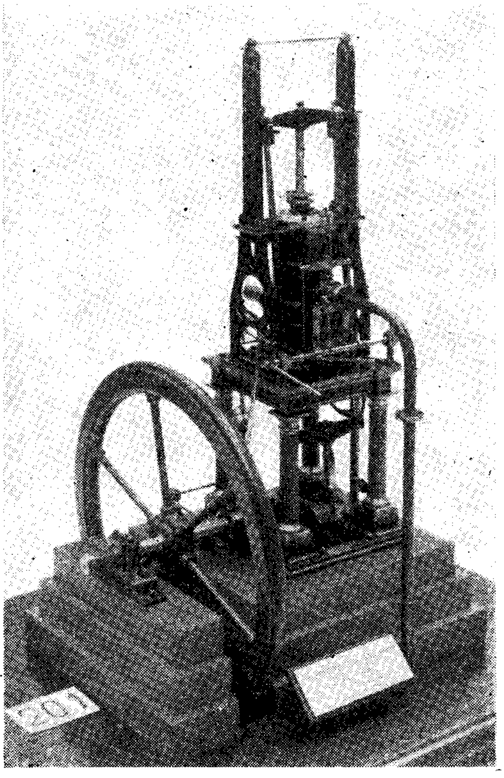


Photo No. 1. In the construction of this beautiful model table-engine, built by Mr. R. W. Wood, of Leeds, no castings were used. The model won a first prize at the N.A.M.E. exhibition

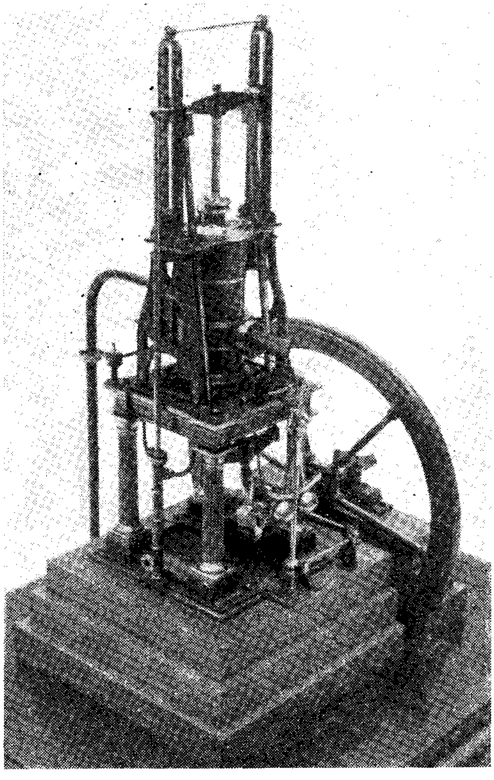


Photo No. 2. The other side of the model table-engine. Note the feed-pump direct driven from cross-head, the Watt-type governor, and the annular trunk to lead the exhaust to the rear of the cylinder

baseboard to the top of the crosshead guides, the overall height is approximately $15\frac{5}{16}$ in., but of this the "masonry foundation" accounts for $2\frac{5}{16}$ in. The flywheel is 8 in. in diameter, and the table is $3\frac{1}{16}$ in. square, with a height above the foundation of 4 in., leaving 7 in. for the height of the guides above the table.

The cylinder is $3\frac{1}{4}$ in. high to the top of the cover, and the Watt-type governor is 5 in. tall. The turned part of the four columns is $2\frac{9}{16}$ in. long by $\frac{9}{16}$ in. diameter at the widest

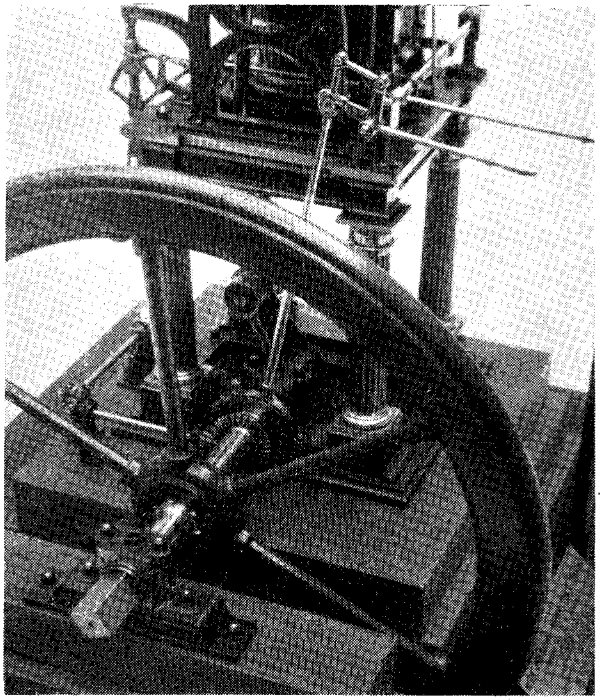


Photo No. 4. The gab of the eccentric-rod is now engaged with its pin on the rocking-lever. The "pillow-block" is also well shown, and the drive for the governor, as well as the flywheel fixing

part, and incidentally (unless my memory plays me false), Mr. Wood told me that there are about 20 ft. of fluting in those four columns! At its base, the foundation is 8 in. × 6 in.

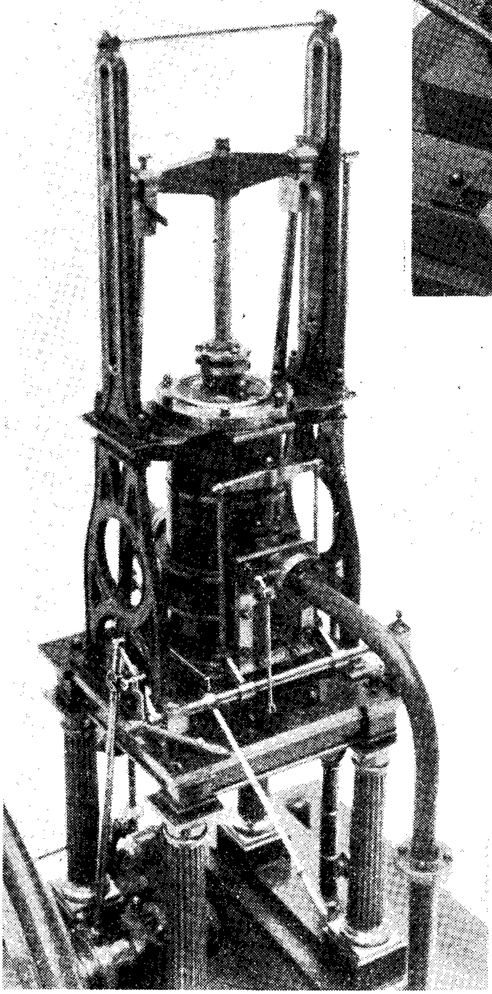


Photo No. 3. In this photo, showing the cross-head slides and valve-gear, the gab is shown disengaged. (See text for explanation.) Note rod and crank controlling governor-valve, in front of valve-chest

Construction of the Model

From these dimensions, the reader will gather that some of the work is very delicate indeed. For example, the governor control-rods are only 3/64 in. in diameter, but are correctly fitted with knuckle-joints, and some of the valve-gear parts are equally slender.

Not a single casting is used in the model, fabrication being used throughout, and without a doubt this contributes handsomely to the "clean-cut" appearance; for some of the mouldings and fillets—for example, on the cross-head guides—are very fine, and would have required an exceptionally skilful moulder to do them justice. And, as has been said before, when only "one or two off" are required, it is often as quick (or quicker) to fabricate the part or parts, as to make a pattern and machine up the casting.

As regards machining itself, no particular problems cropped up; it was all done on a Britannia lathe, including drilling, milling, and planing, besides turning. The fluting of the columns was done with a special milling-cutter, with the column under operation mounted on the cross-slide and indexed with a change-wheel.

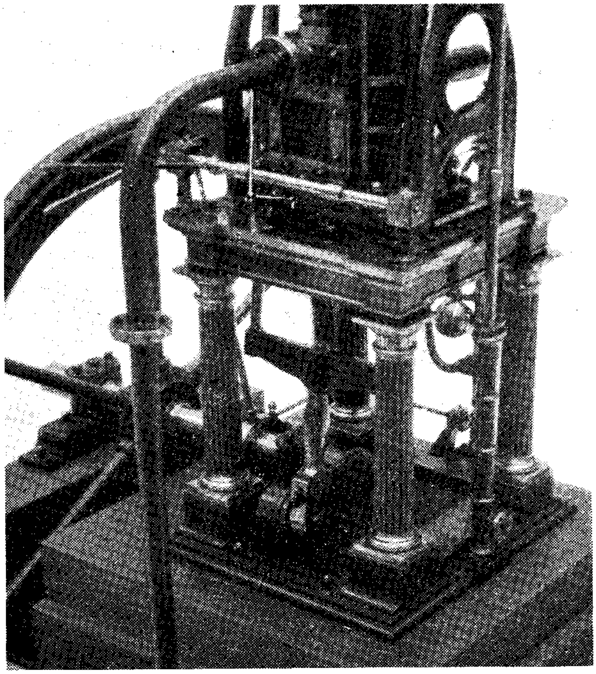


Photo No. 5. This photo shows the table, the big-end and overhung crank, and the feed-pump. Note the tiny cotters used in various places

All the nuts on the model were made from round rod by Mr. Wood, using a filing jig in the lathe. The number includes 72 of 12 B.A. size, although, as the builder said with a smile, these were easier to make than to find when dropped on the workshop floor!

Two points to note, although they may not show very well in the reproduction of the photographs, are the fixing of the flywheel and of the outer "pillow-block." The flywheel is "staked" to the crankshaft—that is, is bored out larger than the shaft and is fixed and trued up for rotation by six keys. The outer pillow-block—or main bearing—is carried in a bracket bolted to the foundation, with wood packing interposed between the block and the bracket. Presumably the idea was to allow for comparatively easy lining-up of the two main bearings.

Valve-gear

Another feature typical of the period is the valve-gear, with gab and lever for hand starting. The D-type slide-valve is carried in a small steam-chest, from which a long external steam-passage leads to the upper end of the cylinder, and a short one to the lower end. Exhaust steam is carried round the cylinder in an external trunk, with the exhaust pipe to the rear.

The valve-rod carries a cross-head, from the ends of which two rods return to two rocker arms on a transverse shaft (*See* Photographs Nos. 3 and 4). This carries a lever—the one nearer the chest—by means of which the valve can be controlled by hand when starting up the engine.

At the flywheel end of the transverse shaft are, first, a rocking-lever, and, second, a bell-crank, the long arm of which is a hand-lever. The short, nearly vertical, arm of this crank is connected to the eccentric-rod by means of a short link: the rocking-lever is keyed to the shaft, while the crank is loose on it.

A small jaw or gab is forged in the eccentric-rod near the top, at a distance corresponding to the length of the short arm of the bell-crank, and by means of the hand-lever, the gab can be engaged with or disengaged from a pin on the rocking-lever.

Hence, when the gab is disengaged, as shown in Photograph No. 3, the valve is *not* driven from the eccentric, but can be controlled by means of the hand-lever. Once the engine is running, however, the gab can be engaged with the pin, as shown in Photograph No. 4, and the eccentric takes control of the valve.

The action of the governor-gear may be traced out on Photographs Nos. 6 and 3, where it will be seen that through a system of rockers, rods

(*Continued on page* 599)

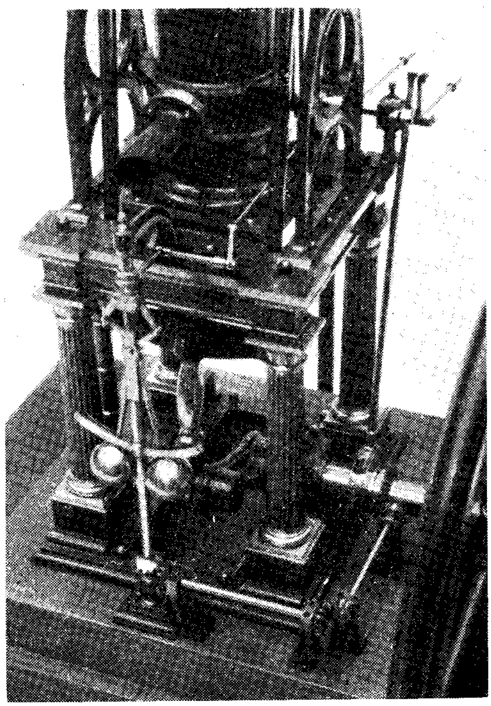


Photo No. 6. Close-up of the governor, with its drive and control-gear

*A Split-Single Two-Stroke Engine

An efficient unit for propelling a class "C" Hydroplane

by R. E. Mitchell

ANOTHER objection to twin carburettors is due to their being displaced laterally by 27/32 in. Due to centrifugal force, fuel feed to the inner carburettor may cease altogether, and would not probably be compensated for completely by the other, thus upsetting the mixture strength after a certain speed had been reached. A manifold in the form of a "Y," using a single carburettor, was considered but had to be abandoned, again because of fouling the magneto. If this is 1/32 in. diameter with two similar holes communicating with the choke. This type of jet is not usually considered to be the best from the performance point of view. The more usual type whereby only the tapered portion of the needle obstructs the gas flow has since been tried, but an improvement in performance was not detected. One disadvantage, however, was noted in that the needle setting for optimum results was made far more critical; too critical

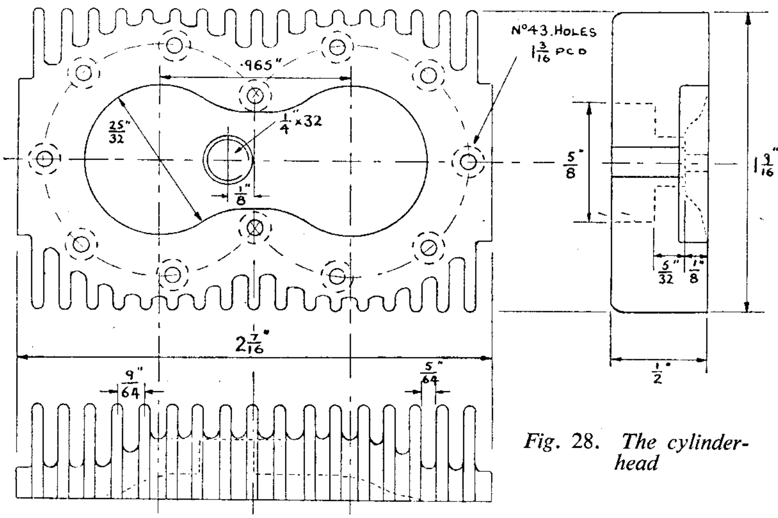


Fig. 28. *The cylinder-head*

could have been avoided the carburettor too near the magneto would probably result in the latter being sprayed with fuel. Although not ideal from the gas flow aspect, the final design decided on is as shown in Figs. 29 and 30. The carburettor is cut from the solid and is of dural. The choke is of oval cross-section and measures 19/64 in. × $\frac{1}{4}$ in., the major dimension being in the horizontal plane. Since with a two-stroke engine having rotary disc inlet valves, the carburettor is very low in the hull, making it rather inaccessible, it was decided to use a jet which can be removed by unscrewing a nut on top of the venturi. The jet assembly is best shown by an illustration and is shown in Figs. 29 and 30. It is made of brass and the jet proper to ensure repeatable performance and was abandoned. The needle is of $\frac{1}{16}$ in. diameter silver-steel soft-soldered into a brass nut which is milled on the outside to engage with a bronze leaf spring anchored to the carburettor body with two 10-B.A. screws. Some designs rely on the friction of tight screw threads to hold the jet needle in position, but this is considered to be a rather crude method, being very susceptible to movement due to engine vibration.

Most engines of 10 c.c. capacity and less are not fitted with any means of controlling their speed. In aircraft practice the propeller does, however, provide a suitable load. One of the surest ways of wrecking an engine is to allow it to attain the high speeds of which it is capable without a load. Under these conditions the centrifugal loads applied, particularly to the connecting-rod, are far in excess of the normal

*Continued from page 570, "M.E.", May 1, 1952.

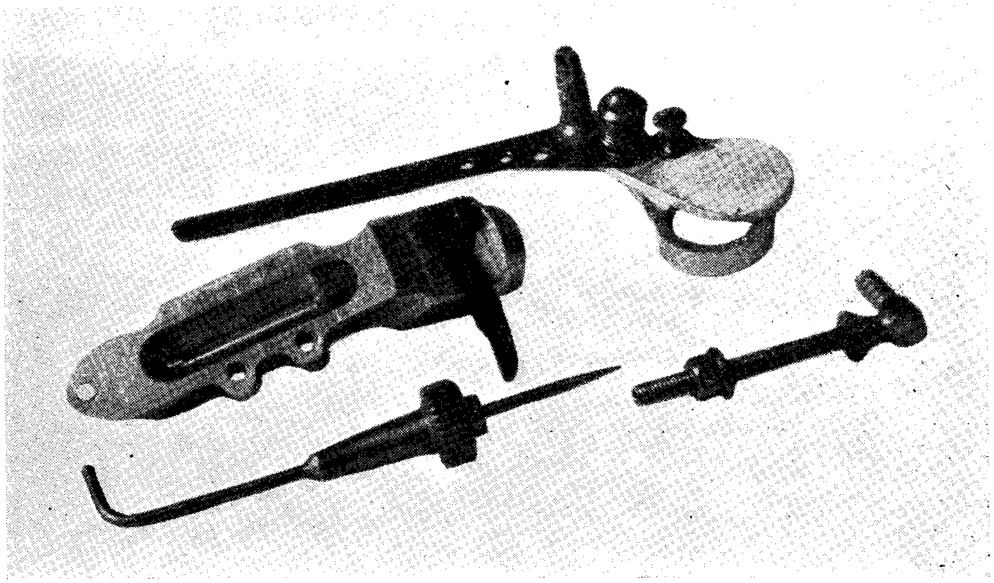


Fig. 29. The carburettor

working stresses. This can easily be avoided by the fitting of a simple strangler consisting of a disc pivoted so that it can be moved across the carburettor inlet, thus obstructing the gas flow. This method has been used successfully on four-stroke engines using spark ignition, and works equally well in the present two-stroke case.

The usual idea that a glow-plug engine is capable of little or no speed control has been found to be erroneous. Poor carburettor design is likely to be mostly responsible. Since the boat in which this engine is installed is fitted with

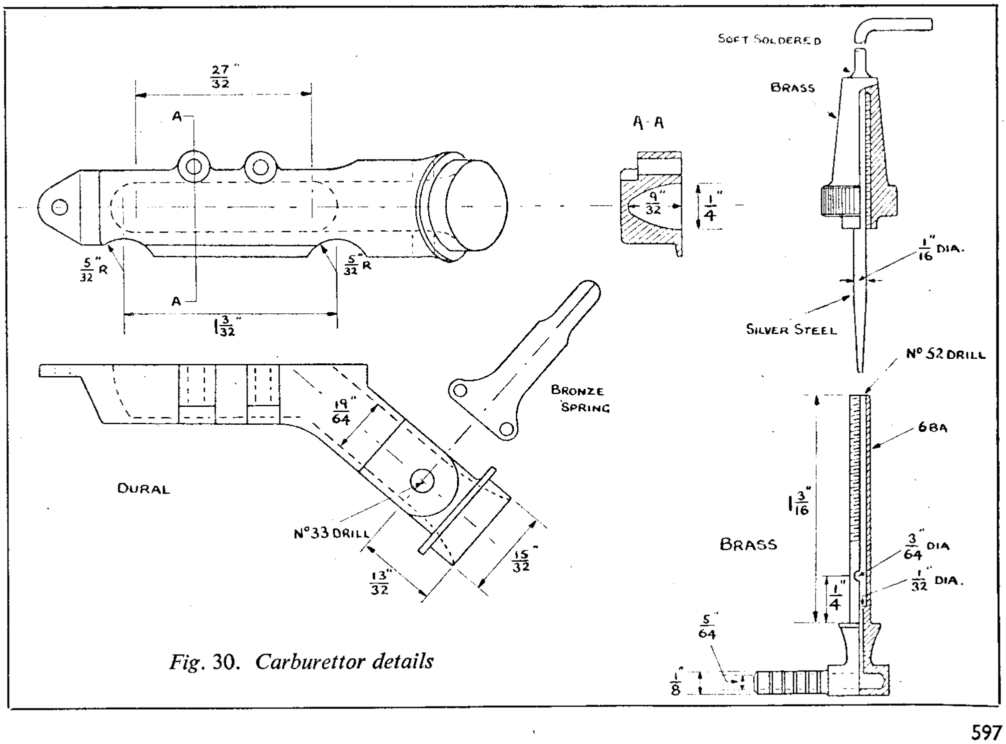


Fig. 30. Carburettor details

a device operated by water pressure in the case of submergence, the strangler disc and its lever are independent although pivoted on the same spindle, as shown in Figs. 29 and 31. Connection between the two is made by means of a peg which is withdrawn when the knock-off device is operated, so allowing the spring-loaded disc to cover the carburettor intake and preventing a charge of water entering the crankcase. Previous experience with water entering a high revving engine has shown that the results can be serious. This is also used as the normal stopping method, and although instruction leaflets accompanying several commercially made engines state that this method must not be used, no harm appears to have arisen from its use. As a matter of interest, the same method has been used for stopping a four-stroke engine with a compression ratio of $14\frac{1}{2} : 1$ where the chances of a hydraulic lock are much greater.

The drilling and tapping of the holes required for holding the various components together was the last operation. The housings for the main bearings are each secured to the crankcase by five screws, the rear crankcase cover by nine screws and the stationary parts of the rotary valves by five screws each. All these screws are 8 B.A. and have cheese-heads. The port belt is secured to the crankcase by four through-going 6-B.A. hexagon-head screws and two 6-B. studs. The studs are used beneath the exhaust ports. The cylinder-head is held down by twelve 8-B.A. cheese-head screws which pass through the finned belt into the port belt, the holes being deeply counterbored to receive the heads. The use of screws in preference to studs and nuts may be regarded as taking the easy way out and is the first design in which they have been used so extensively. Studs have been used in a four-stroke design from which the nuts have never been removed in the four years of its existence. If, however, the threads tapped into the dural do strip, most of the holes being at least three diameters deep, there is sufficient space for them to be tapped out to a larger size. Dismantling an engine except for repairs or alterations should not be carried out, because the alignment is bound to be adversely affected on reassembly.

All the joints, which are fairly wide, are metal to metal, no gaskets or jointing materials whatever are used.

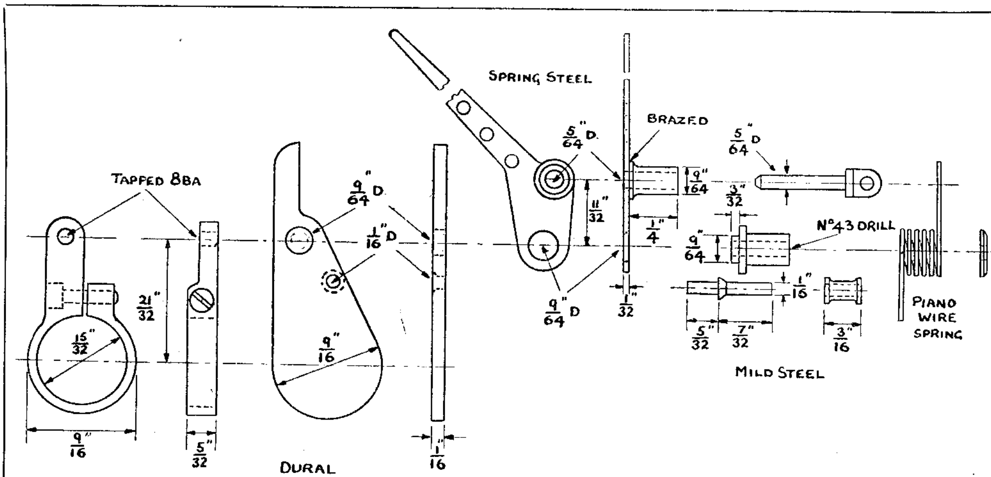


Fig. 31. Carburettor strangler

When first attempting to start the engine a magneto driven from one of the rotary valve spindles was used. The engine stopped after a few revolutions and the trouble was found to be due to the magneto coupling having slipped on the shaft. The flywheels are rather on the light side and the initial acceleration was probably the cause of the trouble. Attempts to remedy the defect failed, and since the power boat season was approaching, the spark ignition was abandoned in favour of a glow-plug. Fig. 17 shows the glow-plug connector which is an improvement on the usual crocodile clip. It consists of a piece of $\frac{1}{4}$ in. thick ebonite sheet provided with two bronze leaf springs which grip the cylinder-head. It is located laterally by the ends of the screws securing these springs engaging in the cylinder-head cooling fins. The switch also contains two bronze spring contacts which normally close on the live terminal of the plug. To disconnect the plug from the battery, the contacts are opened by a cam placed between them.

A 2 V Exide "Gel-Cel" accumulator is used and the length of the leads is adjusted so that the voltage at the plug when on load is 1.5 V. With this arrangement, no glow-plug has been burnt out during the whole of the season.

After running the engine for a few minutes one of the rotary valve spindles seized. This was easily removed by warming the dural bush. The "picked up" metal on the spindle was removed and the valve was replaced. The

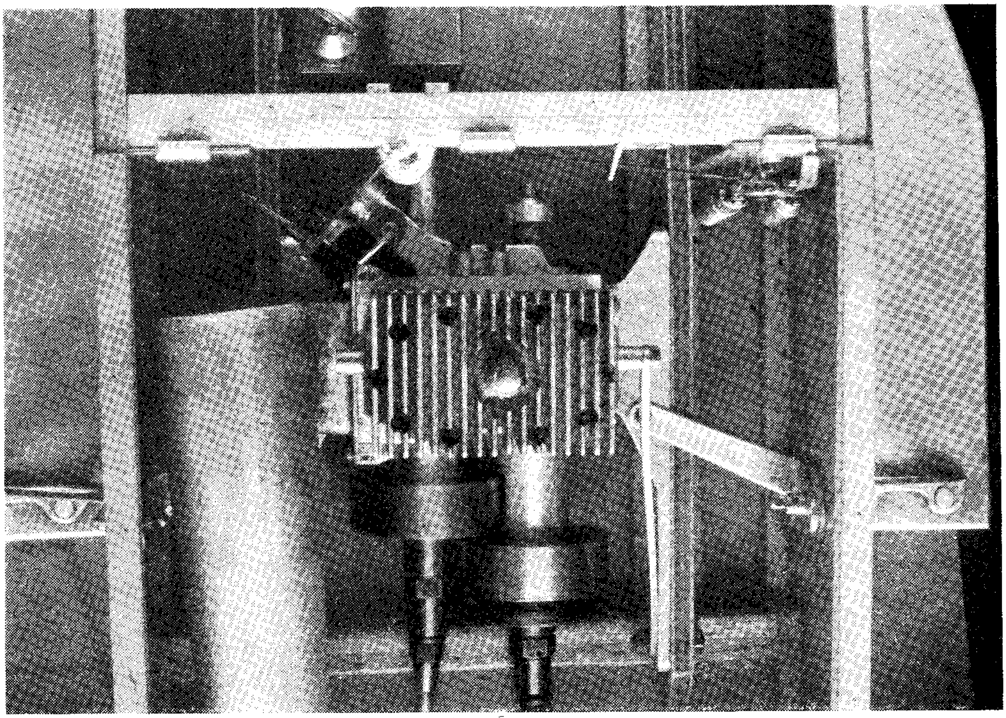


Fig. 32. Engine installed in the hydroplane " Gamma "

engine appeared to behave itself, but the speed of the hydroplane showed signs of dropping.

This was at first thought to be due to piston ring flutter on account of the light ring pressures which were being used. Replacing these with rings having a higher pressure resulted in no detectable improvement. However, when trying the engine with new piston rings, the same rotary valve spindle again seized. Both spindles were removed and a further 0.0005 in. was taken off their diameters. The speed of the boat was thereby increased and no further trouble was experienced on this score.

No attempt has been made to determine the power output, since a dynamometer to absorb the power from the two shafts would be difficult to devise. To take the power from one shaft only would mean that the whole of the output from one cylinder would be transmitting through the synchronising gears, a thing which it is desirous to avoid. Also, no attempt has been made to measure the engine speed when running light, since this only imposes undue stresses on the engine to no purpose.

The final photograph, Fig. 32, shows a plan of the engine as installed in the hydroplane *Gamma*.

A High-Pressure Table-Engine

(*Continued from page* 595)

and links, the governor controls a butterfly-type throttle valve mounted immediately in front of the steam-chest.

Finish

All bright parts of the model are polished to a high degree, using various grades of emery down to " blue-back," and plenty of that useful commodity, elbow-grease. Other parts are a pleasing shade of green, with a stone-coloured foundation and stained and polished base-board. Normally a glass case is used to cover the model, but it may be worked under compressed air.

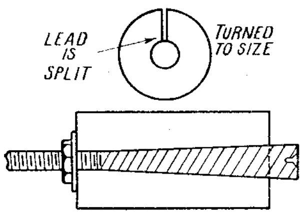
Speaking personally, my chief regret is that I have not had the pleasure of seeing it working. It must be a very pleasant sight, at that stately gait of one revolution in two seconds, and to me, at least, would be worth twenty times the sight of a buzz-box batting round an arena at ninety miles an hour ! It's a good job we aren't all alike, isn't it ?

A Small Vertical Gas Engine

by H. J. Gates

HAVING in my possession a cast-iron crankcase dismantled from a hydraulic pump, I had often looked at it and imagined what a nice little vertical engine it would make, and the more I looked at it the more enthusiastic I became about it, so that by the time I came to making a few sketches I had a good idea what it would look like and also quite a few " brainwaves " to try out.

This crankcase, as you will see from the drawings, is not a " split " type ; it was already bored to take $1\frac{7}{8}$ in. dia. ball-race main bearings, with brass covers and oil seals pressed in to fit a $\frac{3}{4}$ in. dia. shaft and the base was planed flat. The two holding-down bolt holes were ready drilled, as were four $\frac{3}{8}$ in. Whit. holes in the top flange of the casting.



Adjustable lead lap

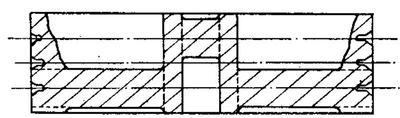
After some deliberation as to this crankcase's future existence as part of an engine, I now had to decide—would it be steam, petrol, or gas ? As I use a small gas engine of the horizontal type to drive my 4-in. Spencer lathe, I chose gas, to be tried with petrol perhaps at a later date.

The crankcase was held in the three-jaw chuck by one of the bearing holes and enough bored out of the inside to accommodate a throw of $1\frac{1}{2}$ in. for the big-end. The casting was then carefully strapped to the faceplate by its base and the throat was bored out to a sliding fit for the bottom of the cylinder barrel, care being taken to see that this bore was in the exact centre.

I had decided to make it water-cooled and the method I used is as follows : I procured a piece of $3\frac{1}{4}$ in. dia. mild-steel, some $2\frac{1}{2}$ in. long (the same diameter as the flange on top of the crankcase) and drilled four $\frac{7}{16}$ in. holes through lengthways to match the four $\frac{3}{8}$ in. Whit. holes already drilled and tapped in the aforesaid " flange." Next, this was held in the three-jaw and drilled and bored about $\frac{1}{16}$ in. under the outside diameter of the liner and then a space bored out to 3 in. diameter, leaving a " land " each end about $\frac{7}{16}$ in. wide. The four holes were then countersunk each end and four steel tubes brazed in and a water connection brazed on the side as per drawing. This shell was now rechucked and the bore finished to $1\frac{13}{16}$ in. spot, a recess formed in the top bore $\frac{1}{8}$ in. deep to suit a rim on the top of the liner and the faces skimmed up.

The liner was attempted next, being turned from a piece of centrifugally cast-iron bar (this is lovely stuff to machine). I left it $\frac{1}{16}$ in. undersize in the bore and +0.005 in. up on the outside and parted it off ; the shell was then heated up on the domestic gas ring and the liner dropped in.

When cooled off, the top face was skimmed right across and, holding by that end, the bore was opened out to finished size minus 0.002 in. lapped out with a lead lap (see sketch) and very fine grinding paste to 1.500 in., checking with a



Method of machining crankshaft from bar

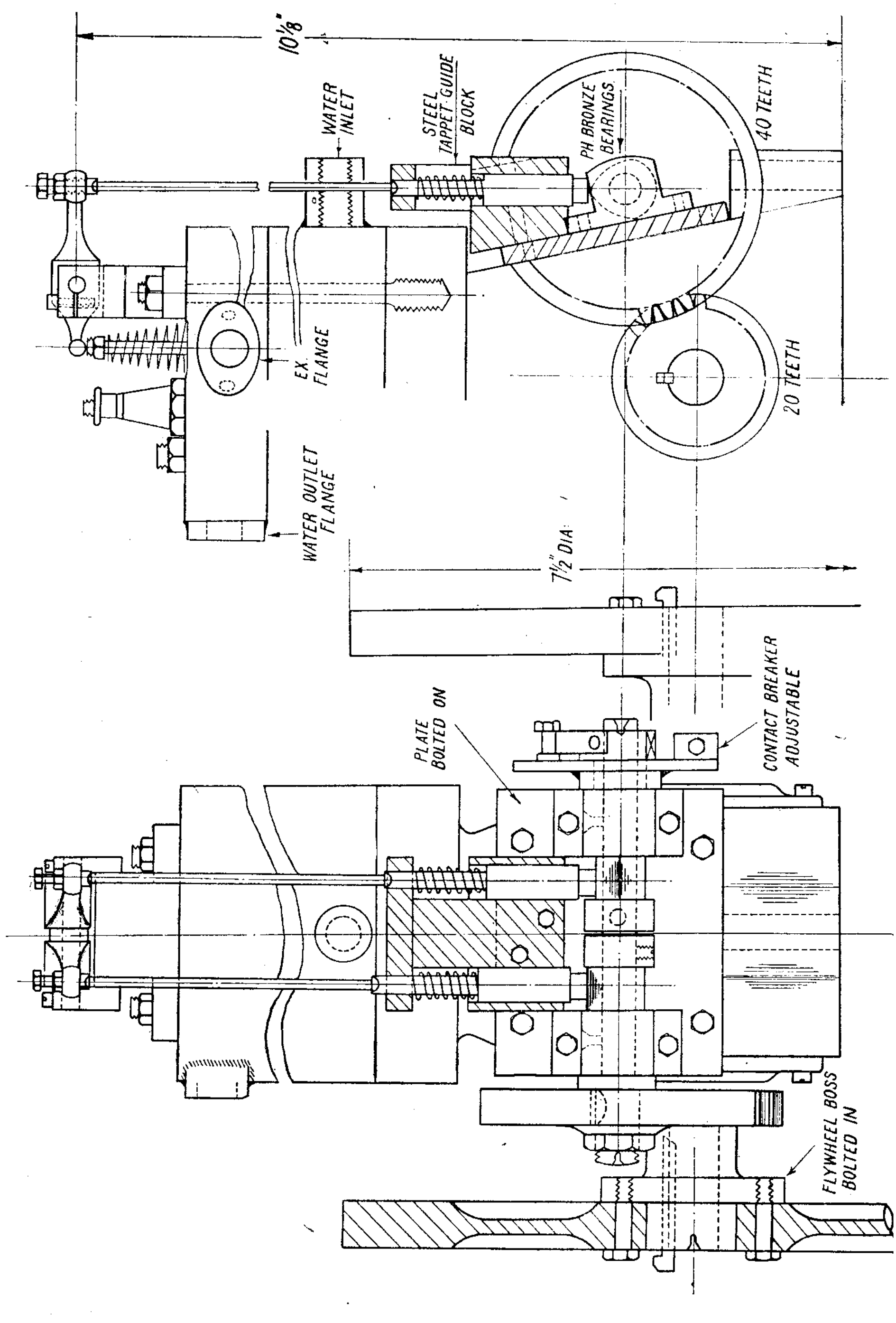
home-made plug-gauge, and the bottom face of the shell skimmed up. The water connection was then drilled right through to the water space and tapped $\frac{1}{8}$ in. gas.

The cylinder-head was made in the same manner but the water groove was bored near the top of the cylinder-head to miss the various ports, and, of course, the exhaust flange. Water outlet flange and stud tubes were brazed before shrinking in the solid cast-iron centre. This was then generally cleaned up and a register turned on the cast-iron to fit the cylinder bore, the cast-iron being left $\frac{1}{16}$ in. proud for this purpose.

The valve holes and plug hole were carefully marked out on a surface plate and machined in the four-jaw, reversed on a stub mandrel in the valve holes, and a shallow half-round groove about $\frac{1}{16}$ in. wide formed round the top of the valve holes to locate the bottom of the valve springs, and the plug hole bored out about $\frac{3}{4}$ in. deep to take most of the plug body.

The ports I drilled by clamping the head on the top-slide and carefully packing for height and alignment, and the exhaust flange and water outlet flange were squared up with a flycutter at the same time. Now, the four water connecting holes were drilled in the top of the cylinder jacket and underside of cylinder-head.

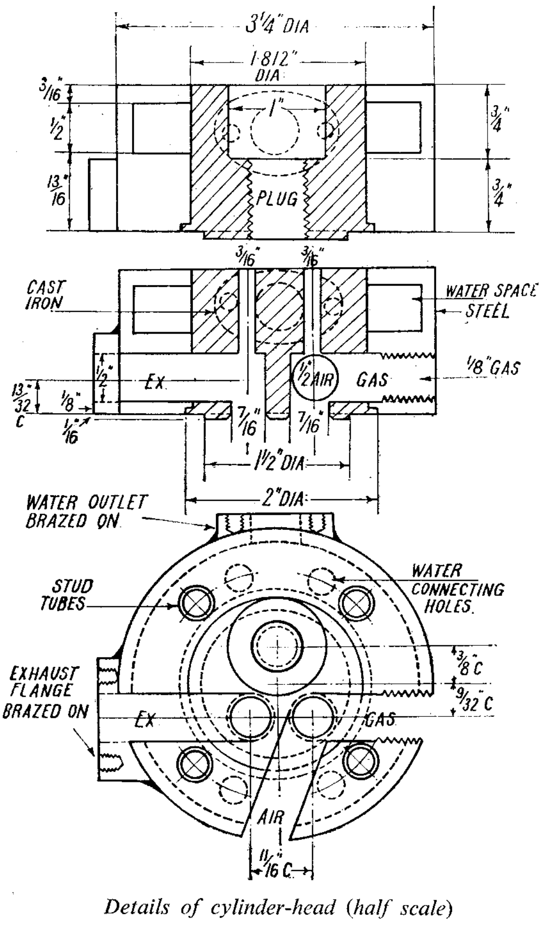
After turning up four studs from 3 per cent. nickel chrome (two were made $\frac{1}{4}$ in. longer to hold the rocker bracket), the lot was bolted together to " see what it looked like." The idea



Arrangement of valve-gear (half scale)

of the " stud tubes " will now be apparent, to take all the strain of the studs or tie-rods which pass through them to the crankcase, and, incidentally, there is no chance of any water getting where it shouldn't be!

The next job I set myself was the crankshaft, which I carved from an odd piece of 1$\frac{3}{4}$ in. diameter E.N. 23 steel by the method shown in sketch. This, and the cams and timing gears were, I consider, the most interesting part of the job.



Details of cylinder-head (half scale)

The webs were fly-cut to $\frac{7}{8}$ in. wide by clamping the crankshaft vertically on the toolpost with a distance-piece between to prevent any spring; when this was done, the shaft was clamped down lengthways and a $\frac{5}{16}$ in. hole drilled through the big-end pin to help strengthen the shaft. I had to drill halfway and turn the shaft round and drill the other half as, owing to the length, the drill would only reach halfway. This hole was also drilled crossways with a $\frac{1}{16}$ in. drill to help lubrication.

The connecting-rod was also turned from an odd piece of E.N. 23 steel, and I just managed to get the two halves of the big-end out of an odd piece of 1$\frac{1}{4}$ in. diameter phosphor-bronze cast bar. When I turned the connecting-rod I drilled a series of holes through the centre of it, starting with a $\frac{3}{8}$ in. hole and following up with a $\frac{5}{16}$ in., $\frac{1}{4}$ in., and $\frac{3}{16}$ in. and finally a $\frac{1}{16}$ in. hole across the small-end. This cut down the weight a bit and also, some oil may find its way up there from the big-end, the top half of which has a spigot turned on it to fit the $\frac{3}{8}$ in. hole and drilled through a $\frac{1}{16}$ in. hole.

The piston is cast-iron fitted with two rings and bored out as much as possible for lightness. I made a special tool to pass through the little-end gap, so as to bore as much as possible from inside the piston head, taking care not to " part it off " by cutting into the piston ring grooves.

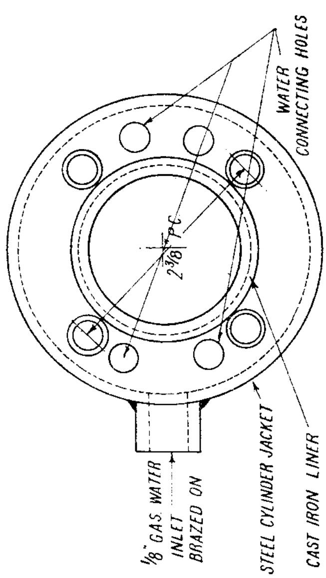
The gudgeon-pin is $\frac{3}{8}$-in. silver-steel drilled through a $\frac{1}{4}$ in. diameter, left in its natural state and an aluminium plug in each end.

After much hammer and chisel work on the inside of the crankcase, to prevent the big-end hitting it at the top and bottom of the stroke, I managed to get this lot together, and by holding the crankshaft in the lathe and setting the lathe going I was duly rewarded with queer sucking and blowing noises from the ports.

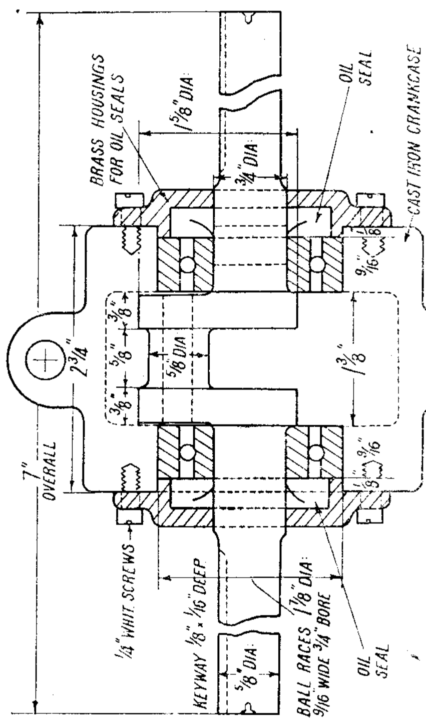
So far so good. Now came my most dreaded part, the valve gear; however, after a lot of " lying in bed at night thinking," the result came out as per the drawing. The rough cast side of the crankcase was carefully filed up flat and square with the bearing hole faces, and a piece of $\frac{3}{16}$ in. thick ground stock bolted on about the same length as the width over the brass end bearing covers. I now had a good flat surface on which to bolt the camshaft bearing and the tappet block and, being on an angle, this came in handy for adjusting the meshing of the gears before finally drilling and tapping for the bearings.

I made a gearcutting " contraption " to fit my lathe which consisted of an angle-plate bolted on the cross-slide in place of the top-slide, carrying a stout pivoted arm provided with a locking bolt for extra rigidity one end (nearest tailstock), and a split hole for locking in a shouldered mandrel the other. This arrangement gave me a rise and fall movement so that I could accommodate a 20- or a 40-tooth gear, using a lathe gear as a master. The flycutters to cut the teeth I ground from broken $\frac{1}{4}$-in. H.S.S. centre drills which I had been saving for an emergency like this, and I found by running the lathe in reverse in top backgear and letting the cutter " climb " into the work I was able to cut to full depth in one cut, letting the cutter run back through to take out any spring. The 20-gear is in cast-iron and the 40 in steel. Incidentally, I also used this attachment to cut the keyways in the crankshaft for the flywheels. The 20-gear is driven by a Woodruff key.

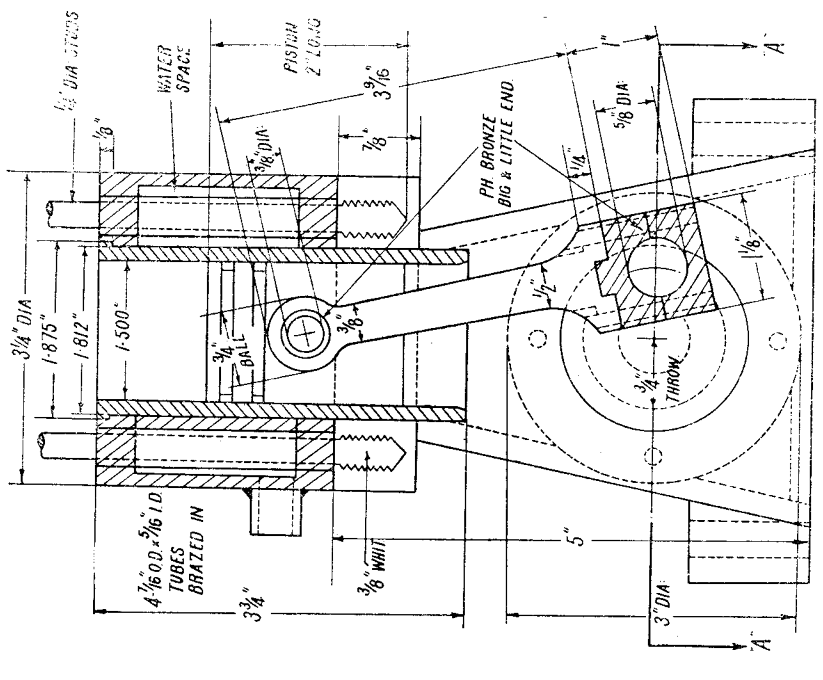
The cams were made by the method shown in the sketch and were carburised and hardened in oil. I doubt if this method will meet with many readers' approval, but for a simple method of production and the ability to find the best running positions, this has worked very well indeed. The cams were carefully marked out on the end of the blank and held on the eccentric mandrel. Each flank face was set to run true by turning the



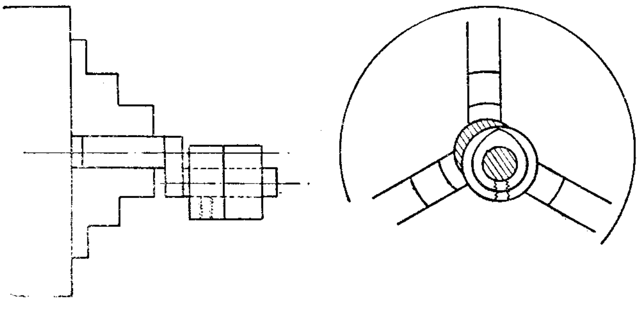
Plan of cylinder, showing stud tubes and water holes to cylinder-head



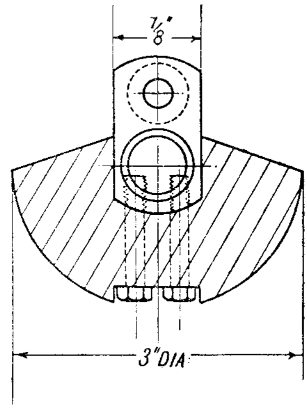
View of crankcase in direction of arrow "A"



Crankcase and water-cooled cylinder (half scale)



Method of making cams



Balance weights bolted to crankshaft

cam to its appropriate position, locked by its 2-B.A. Allen screw and turned, then mounted on a stub mandrel and the base circle turned by pulling the lathe belt backwards and forwards by hand (back-gear) and the tool advanced 5 thous. at a time by the top-slide. The peaks of the cams were then rounded off with a smooth file, a larger radius being filed on the exhaust cam than on the inlet.

The rest of the valve-gear is quite straightforward; the tappets or cam followers are silver-steel, hardened at each end and do not lift far enough to clear the top of the $\frac{3}{8}$-in. reamed guide holes, thereby forming an oil pocket. The push-rods are $\frac{1}{8}$-in. silver-steel, rounded and hardened each end. The rocker arms are turned from $\frac{1}{2}$ in. sq. M.S. and then bent to shape. The valves are from 3 per cent. nickel chrome and the valve springs are wound taper on a taper mandrel with the aid of the screwcutting gear, running the wire between two pieces of wood held in the toolpost to tension it, with the gears set for 8 t.p.i. left hand, working from the large diameter outwards to the small diameter.

Flywheel Construction

The flywheels I managed to get burnt out of $\frac{1}{2}$-in. mild-steel plate roughly 8 in. diameter. These were turned all over a polished finish and the faces recessed out as shown to transfer most of the weight to the rim. The method I used to machine these may be of interest. First, I centred the rough discs and then drilled three 2-B.A. clearance holes which were to be used for bolting in the bosses. One disc was now pressed up to the faceplate with the tailstock and the three holes marked through on to the plate (an old one I keep for such jobs). These were drilled and tapped and a flywheel bolted on and every part that could be turned was done at the one setting, including the bore. The wheels were then reversed and the other side machined and finally skimmed all over from the bosses on a mandrel; all this was necessary, as owners of 4-in. Spencer lathes are not blessed with a gap bed to take large four-jaw chuck work.

The balanceweights were cut from $\frac{3}{8}$-in. mild-steel plate and bolted to the crankshaft webs (see sketch) and finish turned in position. I tested these for balance as per Mr. Westbury's instructions in "Model Petrol Engines," and, touch wood, they were just right! I had a bit of a game fitting these when assembling the engine. Owing to the solid crankcase, they had to be inserted from the open bottom of the crankcase, and tightened up with a home-made 2-B.A. tube spanner. I would have preferred to have used Allen screws for this job.

The engine at present is bolted down on a cast-iron "stool" with an oil sump under the crankcase which is filled with enough oil to rise into the crankcase for the big-end to dip into. A stand pipe gives the depth of oil. I am not really satisfied with this arrangement and hope to improve on the oiling system. I also fitted a breather to the top of the crankcase, but owing to its being very noisy in action and occasionally giving me a squirt of oil into the bargain, I tried the engine without it and found to my surprise that it ran just as well if not better!

In concluding, I would like to say that I am very pleased with my efforts, as this engine runs extremely well on just a "whisper" of gas. The cooling system, too, is right up to its job.

As my first attempt after many years without a workshop, I hope that it will by no means be my last; but, before I start another model, I am going to make myself a drilling machine, although really, I suppose half the fun is getting over the job when your entire machine shop consists of a lathe.

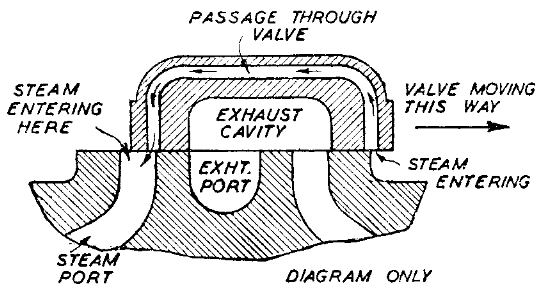
A Steam-driven Outboard Motor

H. J. Turpin writes :—"May I point out an error on the drawing on page 437 in the issue of April 3rd, 1952? A correspondent has informed me that the propeller blades are illustrated the wrong way round. This is so and I apologise for the error. The direction arrows indicate a propeller of the opposite hand from that shown."

"L.B.S.C.'s" Beginners' Corner

"Tricks" of the Trade

SOME of our beginner friends have recently been jogging my memory about a promise not to forget their interests, after the completion of the *Tich* serial, and the notes on the driving car. Certainly I hadn't forgotten it, and intended to address a few remarks especially to them, when opportunity offered and the occasion arose. Well, one of the "joggers" says he has heard about a "trick" slide valve; wants to know what it is, and what special trick there is about it. As the burglar remarked when he started operations on the safe, "There's more in this than meets the eye". The primary reason for the introduction of that particular type of slide valve, is mixed up with other circumstances connected with both slide and piston valves, and steam distribution in general, so we might conveniently use it as a peg on which to hang a little dissertation.



Section of Trick slide valve

Up to the end of last century, the ordinary slide valve, or "short D" valve, as it was usually called to distinguish it from the long valve of beam engine days, was practically universal, as far as locomotives were concerned. Although the piston-valve was designed as far back as the eighteen-thirties—it was proposed to fit them to one of the Liverpool & Manchester Railway engines, and the drawing was actually made, but they were never fitted—there were mechanical troubles which worried the early locomotive engineers quite a lot and they preferred to stick to a faithful and well-tried component. We had one solitary piston-valve engine on the L.B. & S.C. Railway when the twentieth century dawned; No. 431, one of Stroudley's last batch of class C 0-6-0 goods engines, known as the *Jumbos*. They had boilers, cylinders and motion similar to the *Gladstones*, and boy—*could* they pull! When in good fettle they would pull any of old Bob Billinton's "Vulcan" type backwards; and they could run a heavy excursion train, when the occasion arose, as it frequently did in the holiday season, at a mile a minute without any bits falling off. How this came about, I'll explain further down the column. The piston-valves on old 431 were known as "Smith's Patent"; and I'll say they were just that!

Drop of Oil Wanted

Whatever the faults might have been with other companies' piston-valve engines, your humble servant was under no illusion as to the trouble with Mr. Smith's valves. I fired her on several occasions, and from the time we left the sheds, until we got back again, it was nothing but moan, groan and squeak from the front end. We only had simple displacement lubricators in those days, and no amount of wangling the feed, would stop the row. The first time I went out on her it got on my nerves so much that I said to my mate, "Shall I try and stop it?" He was a jolly old boy, one of the old school, and his reply was "I wish to —— you could, I'm —— if I can"; the missing words are railroad Esperanto. The "kettle" (a copper feeder with a wide spout like a torch-lamp) was half full of cylinder oil, so I put a ball of tallow in it, and warmed it up till the whole lot melted; then, as soon as my mate shut the regulator for a falling gradient, I nipped around the front end, opened the valves on the two brass "dope cups" just below the smokebox door, and poured a good dose in each. That did the trick. She was as quiet as a mouse until the effect wore off, and then the music started again. I "ditto repeatoed" about three more times on that trip; but to keep her continually quiet would have needed a season-ticket between the cab and the smokebox, and an unlimited supply of oil-and-tallow mixture on the tender; and a goods engine pulling a heavy load burns quite a lot of coal, which needed shovelling into the firebox, and didn't leave much time for trips to the front end.

Anyway, my mate mentioned the matter to the yard foreman, and said it certainly improved the running, besides stopping the noise; and the yard foreman tackled me about it. I said, "What she needs is a little pump, to give her a constant feed of oil." In those days there were no mechanical lubricators. He said, "Well, why don't you put it to 'the bloke'?" meaning the district superintendent. I did; but—well, I was only a young fireman at the time, and as such, wasn't supposed to have the audacity to offer suggestions on locomotive design—'nuff sed! The one who *would* have listened—Billy Stroudley of fond memory—had long since passed away.

Slide valves of those days had a very short travel; the *Gladstones* only had $3\frac{3}{4}$ in. of movement in full gear, so that the valves didn't shift

much when the engines were running with the lever just off middle, as ours usually did. Consequently, the ports opened and closed very slowly. The valve gear most favoured, was the Stephenson link motion. The L.N.W.R. had some engines with Joy gear, and some with Allan straight links. There were also some Gooch gears floating around; the two latter, by the way, were first cousins to the Stephenson link motion. I've never described how to make either of them, in these notes, but may be able to remedy that, in due course. The old locomotive engineers realised something that I have tried to drive home in these notes during the whole 27½ years that they have been running, viz. that to get the utmost power and acceleration from any locomotive, you need full boiler pressure on the pistons at the exact instant that the crank passes the dead centre. Giving the valves plenty of lead, so as to let steam in early enough to build up the pressure, was one answer; but with the slow-moving valves, this meant that the port would "crack" some time before the crank reached the dead centre. Now you can have too much of a good thing, and an admission point can be made too early, just as the ignition point in an automobile engine can be advanced far enough to make it "konk."

"Lead" and "Pre-admission"

I might here, with advantage, call attention to something that beginners in general don't seem to realise; that is, the difference between "lead" and "pre-admission." If the valves (slide, piston, poppet, or any other kind, it doesn't matter) could be operated instantaneously, *the lead opening could actually be the full port opening*. That assertion is enough to make Mr. I. Knowitall jump clean out of his pants, but nevertheless it is perfectly correct. For the sake of illustration, let us imagine two engines, one with a valve travel of 3½ in., and the other with 7 in., in full gear. Next, we will assume that the valves are set, so that port opening begins when the crank has completed 90 per cent. of its revolution; and that this gives, in the first engine, a lead of ⅛ in. That is, the port is open ⅛ in. when the crank arrives at dead centre. Steam has naturally been going in, from the instant the port "cracked"; but the amount of pressure it has built up on the piston head at dead centre, is governed by the pressure in the steam chest and the length of the port. In the case of the second engine, the valve moves at twice the speed of the first one, so that the lead opening would be ¼ in.; and that obviously gives the steam a far better chance of getting to the job, than in the first case. The point to note is, that in both cases, *the admission point is the same although the second engine has twice as much lead opening as the first*. Carrying the illustration a step further, to the suggested *Queen Mabel*; whilst the admission point still remained constant, the valves would fly open to the full extent allowed by the position of the reversing gear in the cab (that is, wide open when in full gear) as the cranks passed the dead centres. With the variable exhaust to suit, her only speed limit, provided she was correctly balanced, would be the maximum at which she would stay on the rails. Her boiler would see that there was plenty of steam at all times.

The "Trick" Valve

Now we come to the reason for the Trick valve. In case No. 1 quoted above, the veriest Billy Muggins can see that if we want to get the amount of steam into the cylinder, as is possible in case No. 2, we must open the port earlier; but this is going to defeat its own ends, because we shall then be letting steam in *too soon*, and as the pressure builds up, it will have a retarding effect on the piston. Just like one man putting his back against a door, when another one, on the other side, was shutting it. The ports are already as big as the steam chest will allow; the valve will move neither faster nor farther, with its existing valve gear—what is to be done? The designer of the Trick valve solved the problem, and the illustration shows how he did the artful trick. The port face is completely raised, so that there is, in effect, a port bar on the outer side of each steam port. A slot, corresponding to these bars, is cut in the lap at each end of the valve, the slots being connected by a passage cored through the valve itself. Now see what happens: at the same instant that one end of the valve starts to uncover the port, the slot in the lap of the valve at the opposite end, slides over the edge of the outer port bar. Steam thus enters the port at two places. First, it goes in by the ordinary way, viz. between the end of the slide valve and the outer edge of the steam port. Secondly, it goes in between the edge of the outer port bar, and the slot, at the opposite end of the valve, and reaches the port via the passageway in the valve; so we have, in effect, two ports opening at the same time. Simple, but effective! These valves were used by Webb, on some of the L.N.W.R. engines, by Holden, on the Great Eastern (*Petrolea* had them) and by Dean on the Great Western. They were also used by Allen in U.S.A.

Advent of the Long-travel Piston Valve

However, in this benighted world, it often happens that useful things have a short life; and thus it was with the Trick slide-valve. The advent of the long-travel piston-valve killed it absolutely and completely. With the latter, you not only get the big lead opening, with a not-too-early admission point, but you also get the equivalent of a port of relatively enormous length; nearly a yard long, in the case of *Britannia*. Such port openings were obviously far bigger than could ever be obtained by any form of slide valve, Trick or otherwise, and they also provided for a much freer exhaust; and so the slide valve went into honourable retirement. Incidentally, some folk have endeavoured to apply the trick principle to piston valves, but there is not the slightest advantage in a double-ported piston-valve; had there been, it would have appeared in full size long since, and your humble servant would have used it in small engines. With a properly-designed and proportioned piston-valve of the ordinary type, admission and exhaust can be arranged for maximum efficiency in working, both in full size and in our small sisters; and there is nothing to be gained

by adding complications to a single valve. The only superior arrangement would be to fit two valves per cylinder, a la *Lady Vera* and *Queen Mabel.*

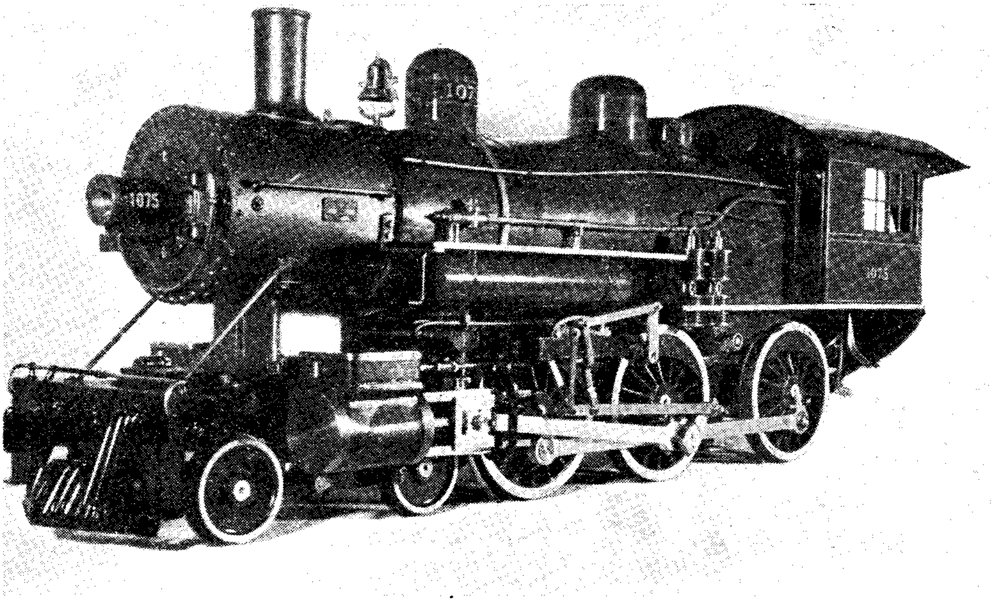
Compression

One subject often interlocks with another; and another beginner's query is related to the above, so I'll deal with it right away. He recalls that I have referred to compression in the cylinders, as the bugbear of a steam locomotive, and says that he doesn't see how this can be; because any power mopped up in compressing spent steam in the cylinder, is released again on the next stroke of the piston, on the principle that if you compress a spring, and then release it, the power absorbed in the compression act is not lost, but merely stored in the spring, in a manner of speaking, for use as desired. For example, you wind up the clock; the energy you put into the winding is stored by the spring, and used by that component to drive the works of the clock.

While this argument is perfectly logical, there is the usual wasp in the jampot. "Power for power" is a fallacy; were it not so, the problem of perpetual motion would be no problem at all, says Pat. I guess most readers have heard of the bright boy who coupled an electric motor and a dynamo together, mechanically and electrically. He had the idea, that once it was started, the current generated by the dynamo would drive the motor, enabling it to drive the dynamo in turn, thus keeping up the supply of "juice" for the motor and so *ad infinitum,* as the third programme might say. But somehow it didn't work out that way. There were little things like bearing friction, and electrical resistance, to overcome; and in any case, the dynamo couldn't convert into electrical energy the whole of the mechanical energy necessary to drive it, so the poor kid was sadly disappointed when the outfit refused to work as desired.

"See How They Run"

The same thing applies to the steam engine.

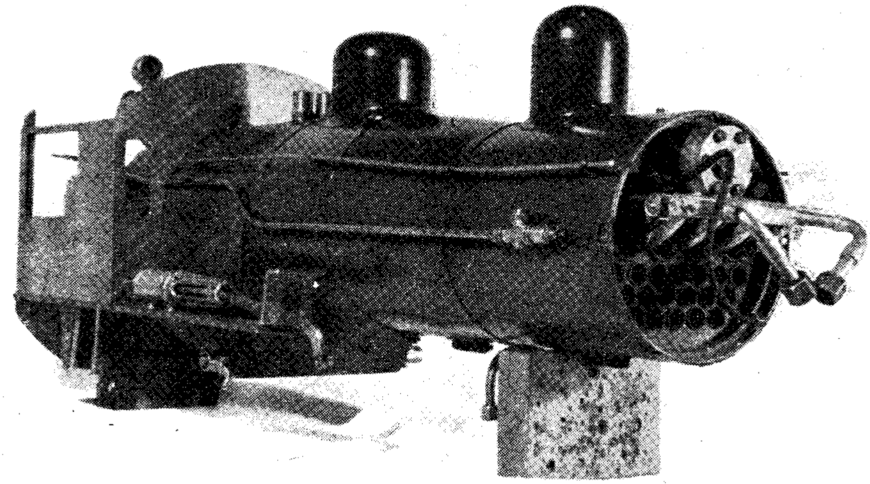


Mr. W. S. Van Brocklin's "Southern" 4-6-0

Not only is less power returned by the "rebound," but the initial force required for the compressing, retards the piston and causes the speed of the engine to be less than what it would be if there were no compression to overcome. In full-size practice, Churchward, of the Great Western, arranged his cylinders and valve gear, so that compression pressure equalled the steam chest pressure at the end of the stroke, and said there was thus no need for a big lead opening on the valves, full pressure being already on the piston. Well, it is a significant fact that, good as the G.W.R. engines undoubtedly are, there are few instances recorded of one ever exceeding 100 m.p.h. This was referred to by that ardent stopwatch specialist, Mr. C. J. Allen, in his articles in the *Railway Magazine*; as far as I recollect, he gave one solitary instance of a 4-6-0 hitting the high spots to that extent, when going down a bank on the Worcester line. On the "fastest ever" of the *Cheltenham Flyer,* the maximum, if I recollect rightly, was 93 m.p.h.

Now supposing we arrange the valves and valve gear, so that there isn't any compression worth writing home about; just a tiny wisp of spent steam left in the cylinder, to act as a very soft cushion for the piston, merely to stop it rattling, so to speak, in case of any slight play

in the motion. Now suppose we open the steam port quick enough and wide enough to give that same piston a full charge of good "redhot" live steam (far different to squashed-up spent stuff) directly the crank passes the dead centre and can take all the "kick" that the piston can give it. With the hot, lively and elastic fresh steam on one side of it, and nothing to check its progress on the other, that piston is going to do the doings in no uncertain and half-hearted manner. The few good folk who have seen my own engines at work on my little railway, have noted "a little bit of something different" about them. The reason for their free running and low steam consumption, is mainly due to absence of back pressure, and to early admission. There are some full-sized engines running, with the same characteristics; and they can not only "march on," as Driver Joy would say, but they can pull their weight as well, having practically all their energy available at the drawbar, instead of having to use some of it to overcome internal resistances.



How to get plenty of really *hot steam* !

In Days Gone By

I mentioned above that the Stroudley *Jumbos* could run as well as pull. The reason for this, was early admission and free exhaust. The ports were 15 in. long, for a cylinder diameter of $18\frac{1}{4}$ in., which wasn't bad at all for those days. The valve travel was only $3\frac{3}{4}$ in. in full gear, same as the *Gladstones*, but the lap was $\frac{7}{8}$ in., and the lead in full gear was nominally $\frac{1}{16}$ in., but actually it was a little more. Some folk assert that certain modern engines with piston-valves and Stephenson link motion, don't have any lead at all in full gear, and the ports do not start to open until the crank has passed dead centre. Some official blueprints of these engines, which I have here at the present moment, show a setting comparable with the old Stroudleys; 'nuff sed! Anyway, as the engines were only in full gear for a few revolutions when starting, and the lead increases on a link-motion engine as soon as she is notched up, the old *Jumbos* did all their acceleration and running on a lead of $\frac{1}{4}$ in. or more; the exhaust opened early and stayed open long enough to reduce compression to the minimum. Like all the Stroudley engines, there was one cut-off point where admission and exhaust seemed to be—well, what you might call in perfect relationship; and with the lever in that position (or screw reverser, as the case might be) and the regulator wide open, they would run at a tremendous lick, apparently without effort, and merely a purring exhaust, when hauling an excursion train of about 16 four- or six-wheelers. They must have thought it a mere featherweight after the usual 60 wagons!

Another good point about the old girls, was their free coasting. The valves being below the cylinders, they dropped clear of the portfaces as soon as the regulator was shut, and left both steam ports open to the steamchest. Consequently, there was no pumping action to suck air down the blastpipe, and no snifting valves were needed. A $3\frac{1}{2}$-in. gauge L.B.S.C. Railway *Jumbo* would be comparatively more powerful than one of the *Minx* type; and if I'm still writing these notes when the world recovers from the bloodshed-and-destruction craze, and materials are again available, I might be able to do something about it, circumstances and the K.B.P. permitting. Meantime, I've some more *Britannia* drawings requiring immediate attention, so will now bid you farewell for another week.

A RULE ATTACHMENT

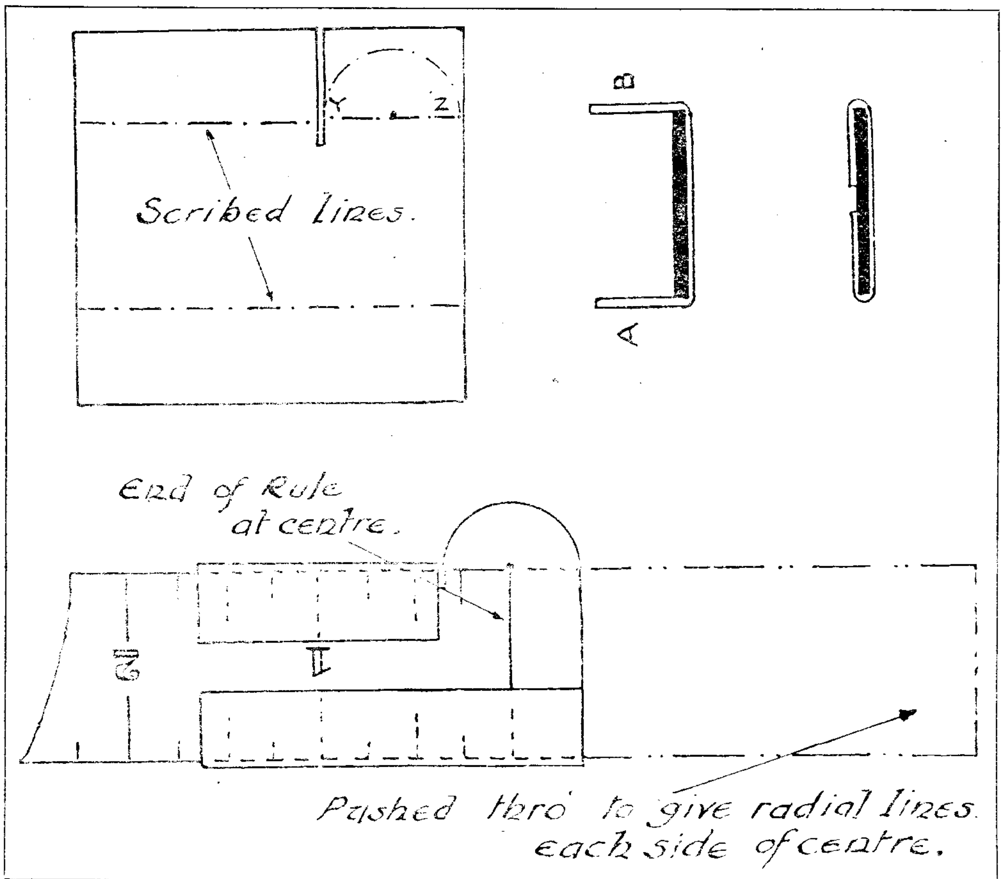
by S. F. Weston

OCCASIONALLY, it is required to mark-off a number of radial lines, and the small fitting for attaching to a steel-rule described here facilitates this work and ensures all lines to radiate truly from the centre. The slide is simple, very easy to make, and can be applied to or detached from the rule instantly.

To make the slide, use a piece of thin sheet brass—say, about 24-gauge. Cut a piece about two inches square, square it up truly, anneal it by heating to a bright cherry red and allow it to cool slowly. When quite cold, flatten it between two pieces of wood and polish it both sides.

Make a saw-cut $\frac{3}{4}$ in. from one end and $\frac{5}{8}$ in. long. Assuming the rule to be 1 in wide, very carefully centre it on the brass square, at right-angles to the saw-cut, and scribe a line on either side, but do not, at this stage, scribe beyond the saw-cut. Check very carefully to make sure the scribed lines are equidistant from each edge and parallel thereto. Now, very carefully, bend the portions *A* and *B* at right-angles. The rule should slide easily in the channel thus formed, but without any side slogger. Bend over *A* and *B* to embrace and grip the rule firmly but allow the fitting to slide stiffly along its length.

With the rule in position, now scribe the line beyond the saw-cut—this line is marked *YZ* on the sketch. Carefully centre-pop the centre of this line and scribe the semi-circle shown. Cut and file up to this line, file and draw file ends. Finally, drill a small hole of a diameter to suit your work. The pin passing though this hole should be a neat fit to prevent any slogger. It will be found that lines scribed against the rule are truly radial to the centre.

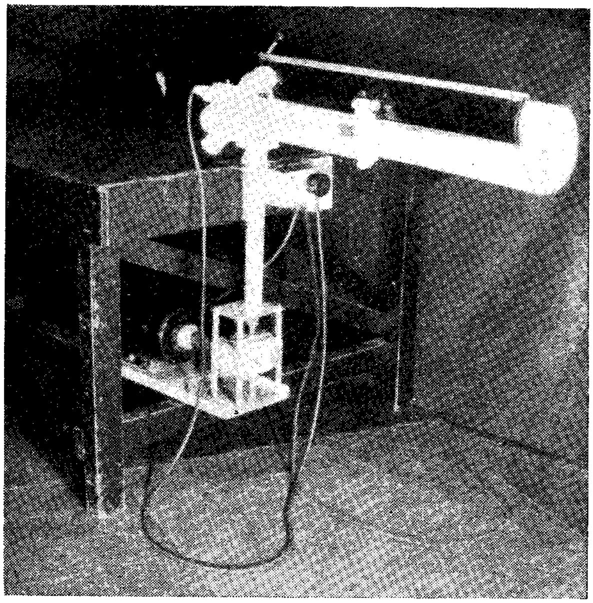


Housewife's Help

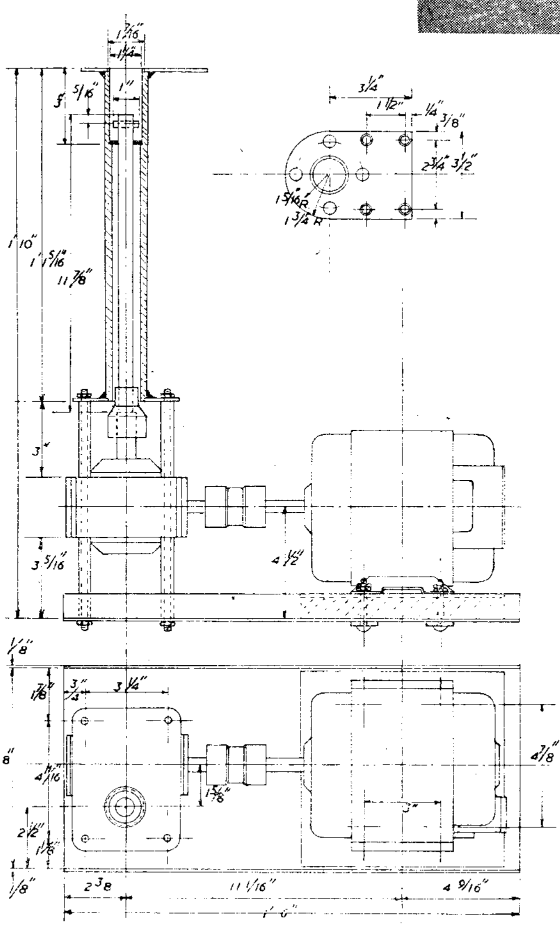
A Motor Mounting for the Ironing Machine

by D. S. Glibborn

I SHOULD imagine that I would find myself in very good company if I were to remark that modelling activities have been considerably delayed by the necessity to begin, continue or complete some work around the house and precincts, either to improve the amenities or to provide some gadgets to lighten the tasks and duties of "she who must be obeyed." In these circumstances there is a glow of self-righteous satisfaction which is increased tenfold if there is the additional knowledge that some vital part of your plant has been surrendered in the good cause.



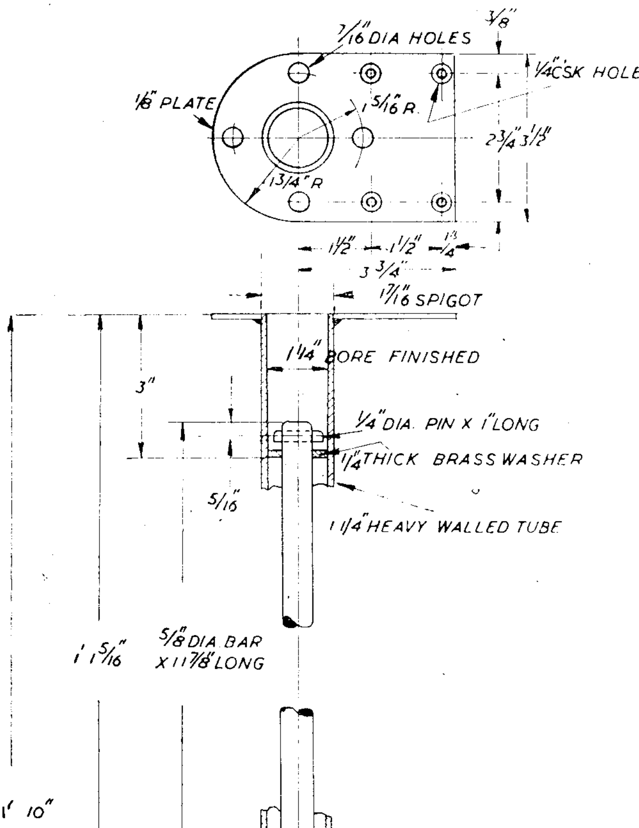
Machine roller outboard of table (enabling two people to operate, thus facilitating progress)



How it started

In my case it happened thus: A "Hotpoint" ironing machine with rotating pad was ordered "blind" and on delivery proved to be of a type that did not incorporate its own drive, and would normally be fitted to a "Hotpoint" washing machine, or other appropriate type, by means of a suitable adapter. As our own washing machine is not a "Hotpoint," it was decided not to adapt the ironing machine to it because of the daily use of the washing machine to meet the requirements of a rather numerous household, but to provide a drive and mounting on its own account. Hence the decision was taken to surrender the $\frac{1}{4}$-h.p. motor normally employed to drive my lathe.

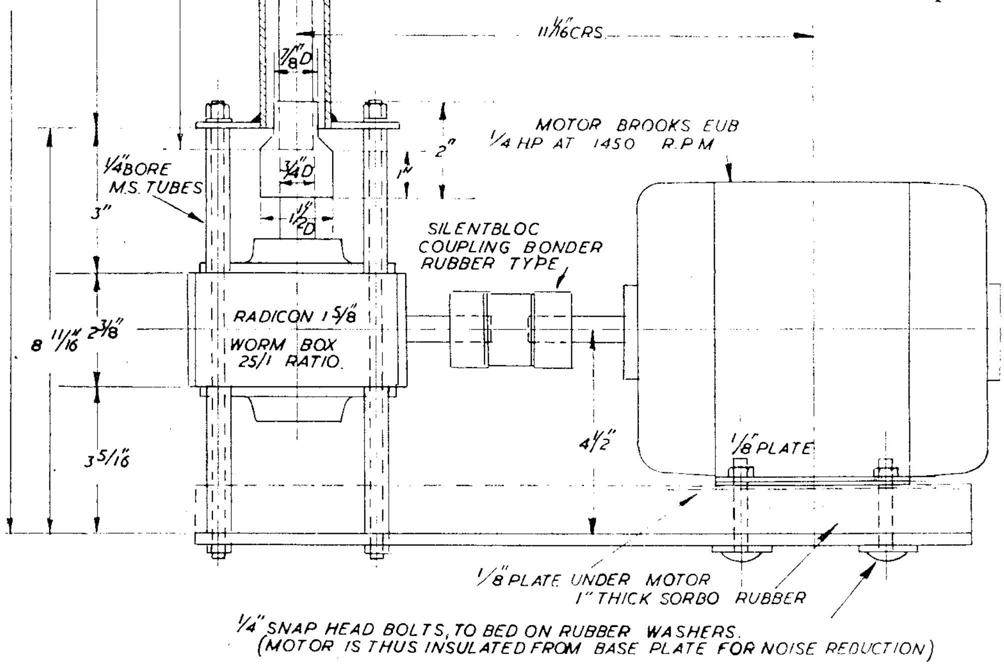
The method of mounting and driving the ironing machine may be of interest in that other readers may desire to attempt a somewhat similar job, especially

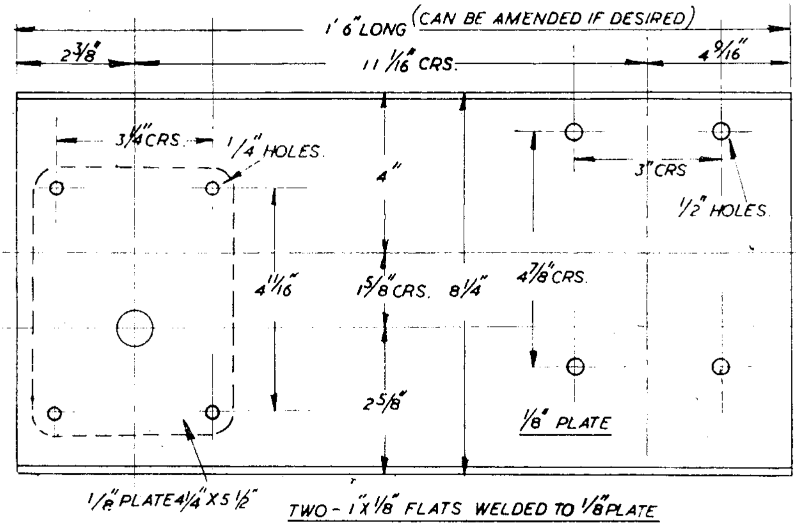


when it is realised that the ironing attachment appears to be more readily available than the "Hotpoint" washing machine itself.

The essential details may be followed from the drawings and reference to the photograph should clarify any points in doubt. The availability of a heavy wooden table was a help, but as home-grown and other hardwood can be purchased now, it should not prove difficult to construct a suitable wooden mounting with flat top if desired. The metal parts are so designed as to allow the ironer to be used in any one of four positions: (1) outboard of the table (2) and (3) along the edge of the table to R.H. or L.H., and (4) over the table top.

The essential feature of the design is the employment of a $1\frac{5}{8}$ in. Radicon worm reducing gear of 25 : 1 ratio—as made by Messrs. Brown. It is probable that a $1\frac{1}{8}$-in. Radicon gear would be sufficient, as it is by no means certain that the full $\frac{1}{4}$ h.p. of the motor is normally required, and the usage of the machine is intermittent. A rubber-bonded coupling between motor and worm-box ensures due resiliency, and in conjunction with the 1 in. thick rubber pad has the effect of reducing motor hum. The vertical heavy gauge steel tubing has been welded to the top and





bottom plates, but brazing should suffice since most of the load is downwards, and brazing should also be strong enough to retain the stiffening upstands on the baseplate. Guards of tin-plate had yet to be fitted at the time the photograph was taken, but these are added readily.

The interlocking plug at the side of the table is arranged to ensure that the plug for the heater is inserted before depressing the switch, which then starts the motor and so prevents the heater being left in close contact with the pad on the roller unless the roller is also rotating—apart from the deliberate freeing of the roller whenever it is used for special pressing operations.

The use of the machine has lightened and shortened a task which can never be regarded as exactly a popular one. By using the roller in the outboard position it is possible for two people to sit one on either side and complete several hours' ironing in less than half the normal time for work done on an ironing board. The whole project has been voted a huge success—and with an eye to future " business " a two-groove pulley has been left on the motor shaft to enable a drive to be taken to suit some of my own more personal schemes.

The Model Power Boat Association

Revised Fixture List of Regattas for 1952

May 18th. South London M.E.S. at Brockwell Park, London, S.W. (Free running boats only.)

May 25th. Victoria M.S.C. at Victoria Park, Hackney, E.9.

May 31st (Whit. Sat.). Welling and District M.E.S. at Belvedere Recreation Ground. (Free running boats only.)

June 2nd (Whit. Mon.). Bournville M.Y. & P.B.C. at the Valley Pool, Bournville, Birmingham.

June 8th. M.P.B.A. International Regatta at Victoria Park, Hackney, E.9.

June 15th. Blackheath M.P.B.C. at Princess of Wales Pond, Blackheath, S.E.3.

June 22nd. St. Albans and District M.E.S. and London S.M.E. at Verulamium, St. Albans.

June 28th. Glasgow S.M.E. at Maxwell Park, Glasgow. (Scottish Speed Championship.)

June 29th. Orpington M.E.S. at Victoria Park, Hackney, E.9.

July 6th. Wicksteed M.Y. & P.B.C. at Wicksteed Park, Kettering.

July 13th. Derby M.R.C. at Allestree Park, Derby.

July 20th. Bedford M.E.S. at Longholme Lake, Bedford.

July 26th, 27th. Hispano Suiza and Ford Trophy Races. Venue to be decided.

August 10th. South London M.E.S. at Brockwell Park, London, S.W. (Speed only.)

August 17th. Southampton and District M.E.S. at Ornamental Lake, Southampton Common.

August 31st. M.P.B.A. Grand Regatta at Victoria Park, Hackney, E.9.

September 7th. Coventry M.E.S. at Nauls Mill Park, Coventry.

September 14th. Kingsmere M.P.B.C. at Kingsmere Pond, Putney Heath.

September 21st. Southend M.P.B.C. at Southend-on-Sea.

Hon. Secretary: J. H. Benson, 25, St. Johns Road, Sidcup, Kent.

"COLNE VALLEY No. 1"

An interesting little locomotive that makes a good subject for a model

by Ronald H. Clark, A.M.I.Mech.E.

OLDER readers may well remember the Colne Valley Railway of pre-grouping days, that little separate line connecting Chappel (Essex) with Haverhill (Suffolk), both termini being on the Colchester-Cambridge line of the old G.E.R. As its name suggests, the line traversed the valley of the River Colne, through some of the best scenery in North Essex and served the town of Halstead and the large villages of Sible and Castle Hedingham, the last-named renowned, as one would imagine, for its castle.

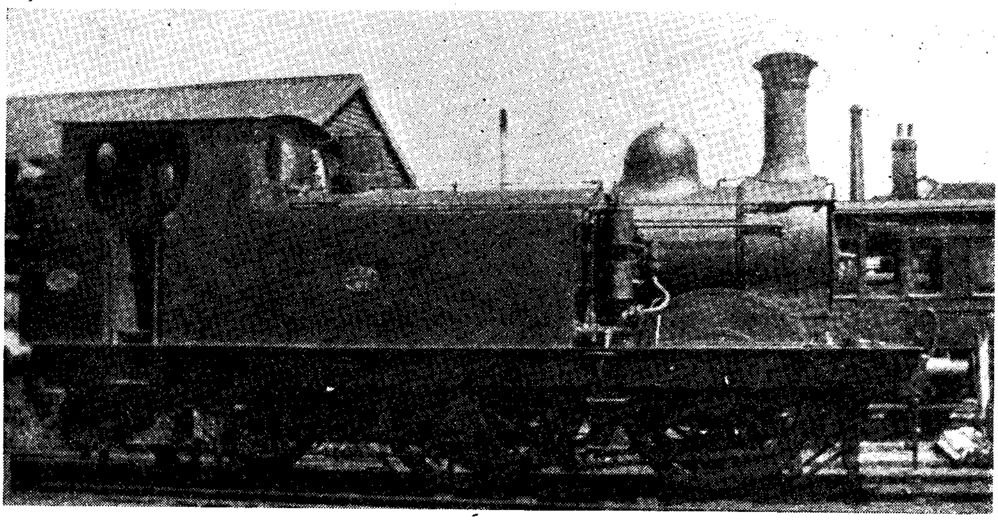


Fig. 1. *Offside prospect of C.V.R. No.* 1

The Line

The first Act authorising the C.V.R. was dated June 30th, 1856, and the single line was opened for six miles as far as Halstead on October 16th, 1860. It was not until August 13th, 1859, that authority was obtained for the extension to Haverhill, the final connection from Halstead to Haverhill being completed on May 10th, 1863, the length of the route now totalling 19 miles. Lastly, a short loop line, one mile long, joining Haverhill Colne Valley station (Haverhill South) with Haverhill Great Eastern station (Haverhill North), was completed on August 9th, 1865; it is interesting to note, in passing, that Haverhill North station is in Suffolk and Haverhill South station is in Essex.

The first locomotives were two hired six-coupled engines with side tanks and named *Cam* and *Colne*. By 1861, they had gone and in their place the company bought two second-hand engines, one a 2-4-0 with haystack firebox and the other a 2-2-2 in rather poor condition. Next, these were superseded by three 2-4-0 locomotives purchased new this time, having side tanks, and large fluted steam domes; they were named *Brewster*, *Colne* and *Halstead* and delivered from Messrs. Manning Wardle & Company in 1861, 1862 and 1863, respectively, but apparently they had no numbers allotted. After a few years it was found that with one of these three laid off for repairs, there was need for yet another engine; therefore, in 1876 a fourth was ordered from Messrs. Neilson & Company and it was delivered in 1877. (Maker's No. 2204.) It was at once numbered "1" by the C.V.R. and is the engine which is the subject of these notes.

Good Looks

It had the 0-4-2 wheel arrangement, was painted a dark green which was the company's livery at that time, and its good looks were enhanced by one spring-loaded safety-valve enclosed in a polished brass casing near the cab and an unenclosed Salter safety-valve mounted on and at the side of the dome. A nameplate

was fixed to each side tank. Its life was a long and useful one, and during this time it underwent three complete overhauls or rebuilds, the first being in 1888 when the job was carried out by Messrs Hawthorn Leslie & Company Limited. Supplementary side tanks were added, the cab modified from that with rounded corners to one with square corners and an almost flat top, and the finished engine emerged from the paint shop a deep red. The year 1894 saw its first rebuild, this time at the Stratford works of the G.E.R., when it was disimproved by the substitution of an ugly stovepipe chimney and a coat of raven black. A last rebuild took place as the nameplate recorded, *viz.* "Rebuilt Halstead 1911," and the author can just remember as a very small and inquisitive boy the highly polished safety-valve casing and lustrous new black livery borne by No. 1 the year following. Now, gone were the supplementary side tanks and, to my eager eye, the new bell-topped chimney was the very king of chimneys! Some time during the 1914-18 war the picturesque Salter safety-valves were removed and a standard Ramsbottom type fitted

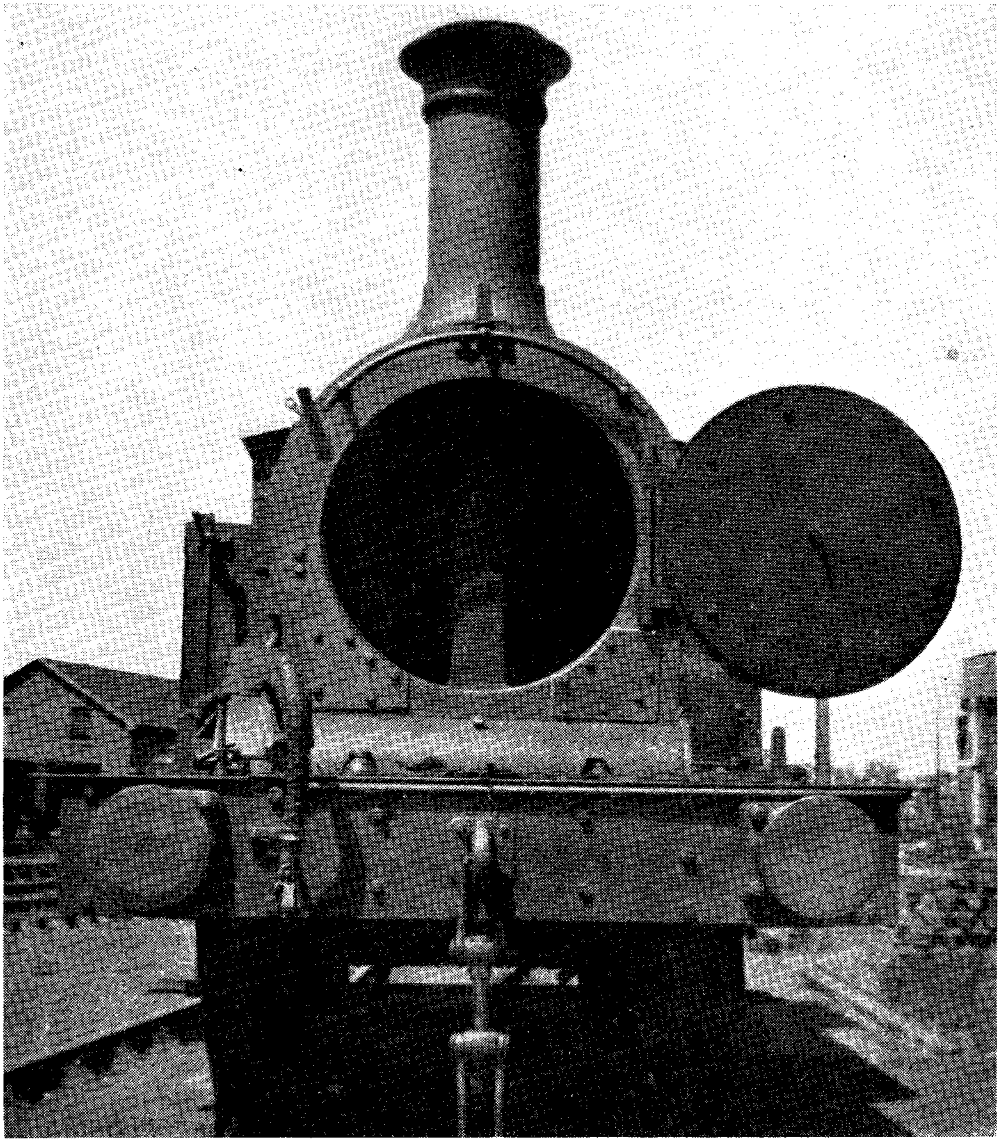


Fig. 2. Front view of No. 1 with smokebox door open

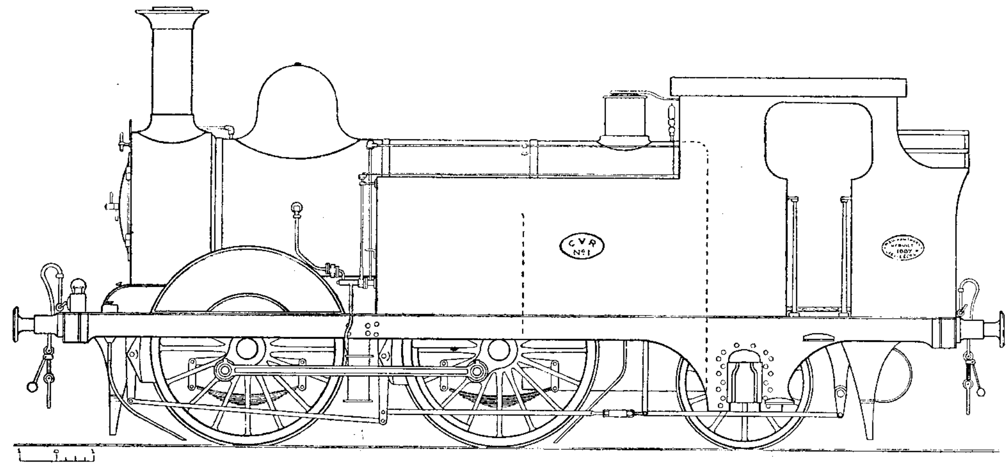


Fig. 3. Side elevation of C.V.R. locomotive No. 1

adjacent to the cab, and this final form is depicted in Fig. 1.

Fig. 2 is a front end view with smokebox door open to show the blast pipe and other fittings. Figs. 1 and 2 were taken by the author at Halstead in July, 1923, when his affection for No. 1 was in no way affected by regarding it then through the more critical eye of a technical student. Good fortune favoured him that week, and one journey was made on the footplate to Chappel and back and another to Hedingham, while one day the old safety-valve casing, rather reminiscent of a diabolo reel, but sometimes called the trumpet, was found forlorn and dusty in a corner of the repair shop. Several trips were also made on No. 5, the heavy Hudswell Clarke goods engine, but that's another story! Finally, No. 1 disappeared, and on a visit to Stratford Works at the beginning of 1924 it was seen on the siding of the scrap yard awaiting its end after a useful life of nearly half a century.

The following are the leading dimensions :—

Gauge	4 ft. $8\frac{1}{2}$ in.
Overall length over buffers	27 ft.
,, width	7 ft. 8 in.
Buffers, horizontal centres	5 ft. 8 in.
,, dia.	1 ft.
Height to centreline of boiler	6 ft. 6 in.
,, ,, ,, ,, buffers	3 ft. 4 in.
Driving wheels, dia.	5 ft. 3 in.
Trailing wheels, dia.	3 ft. 7 in.
Wheelbase, coupled	6 ft. 10 in.
,, total	13 ft. 6 in.
Bunker capacity, cwts.	52.5
Boiler :	
Overall length	13 ft. $5\frac{1}{4}$ in.
Barrel dia.	3 ft. 9 in.
Firebox, length × width	5 ft. × 3 ft. $11\frac{3}{4}$ in.
,, stays, dia.	1 in.
Dome, internal,	
dia.	1 ft. $9\frac{3}{4}$ in.
Height	$11\frac{3}{8}$ in.
Steam pipe, dia. inside	4 in.
Springs, centres of shackles	3 ft.
Tanks, capacity, gals	850
Smokebox, dia.	4 ft. 1 in.
,, length	2 ft. 2 in.
Crank axle, dia.	$6\frac{1}{2}$ in.
Crank webs, apart	4 in.
Trailing axle, dia.	5 in.
Connecting-rod centres	5 ft. 4 in.
Piston-rod, length	3 ft. 8 in.
,, dia.	$2\frac{1}{2}$ in.
Eccentric-rods, dia.	$1\frac{1}{2}$ in.
Crossheads, width × length	$11\frac{1}{2}$ in. × 10 in.
Cylinders, dia.	15 in.
,, stroke	22 in.
,, inclined	1 in. 10
,, horizontal centres	2 ft. 4 in.
,, steam ports, width	$1\frac{1}{4}$ in.
,, exhaust ports, width	$2\frac{1}{2}$ in.
Stroke of coupling-rods	1 ft. 8 in.
Heating surface :	
Tubes (158 × $1\frac{3}{4}$ in. dia.)	680.3 sq. ft.
Firebox	72.3 sq. ft.
Total	752.6 sq. ft.
Grate area	13.35 sq. ft.
Working pressure, p.s.i.	140
Tractive effort at 85% W.P. lb.	9,350

The leading particulars should be read in conjunction with the line drawing included in Fig. 3 prepared from details copied by the writer from the maker's original drawing existing in the Halstead offices of the C.V.R. nearly 30 years ago. It is not now to be found, and neither can the makers find theirs!

In conclusion, I would offer the suggestion that old No. 1 would look very nice in a 5-in. gauge version.

Novices' Corner

Setting-Up Work on the Angle-Plate

WHEN marking-out a piece of flat material with the surface gauge resting on the surface plate, it is, as a rule, important to maintain the work in a truly upright position ; in addition, the rule used for setting the scriber of the surface gauge must also be held vertically in order to obtain a true reading.

As represented in Fig. 1, an angle-plate may be used for both these purposes, and toolmaker's clamps can be applied, where necessary, to hold the parts securely in place.

An angle-plate, when bolted to the lathe faceplate, often provides a convenient and accurate means of machining a second surface truly at right-angles to one previously machined. Although an ordinary angle-plate can often quite well be used for this purpose, the angle-plate illustrated in Fig. 2 is specially made by Messrs. Myford for bolting to the faceplate ; its small overhang and curved outer edge allow it to run in the gap in the lathe bed, even when mounted near the periphery of the faceplate for holding large work.

The method of attaching a casting to the faceplate in this way, for boring two bearings in line, is illustrated in Fig. 3. Two clamping plates, similar to that fitted to the lathe toolpost, are used to secure the base of the casting to the angle-plate. The casting had been previously marked-out and a hole drilled at either end to remove the greater part of the surplus metal.

The outer drill hole is set to run truly with the aid of the test indicator when fitted with its reverse attachment for making internal contact within the bore. For greater security, and to hold the machined back face of the work against the faceplate, a third clamp is fitted, as shown in the illustration. Finally, the parts are brought into balance by fitting a counterpoise and altering the amount of weight, or its position on the faceplate, until a balance is obtained. When doing this, the driving belt is slackened to allow the lathe mandrel to rotate freely. If the faceplate is then spun by hand, the work should show no tendency to stop or set in any one position when the set-up as a whole is in balance.

It should, however, be pointed out that, in this way, merely a static balance and not a running balance is obtained, but this should suffice, as long as the lathe is run at slow or moderate speeds. Unbalanced forces may seriously affect the accuracy of the subsequent machining, and they also throw an increasing load on the mandrel bearings as the speed rises.

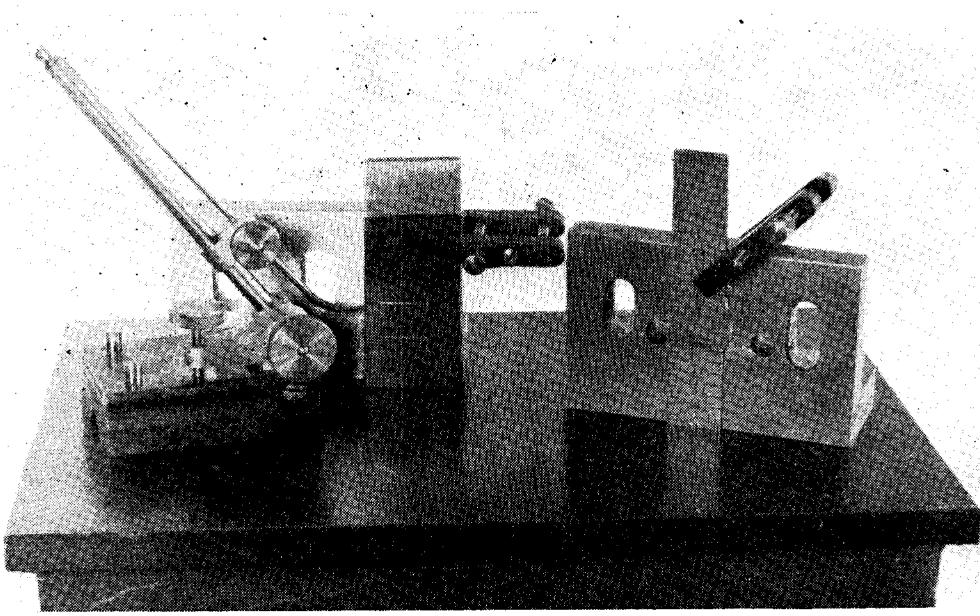


Fig. 1. Angle-plates used for marking-out on the surface plate

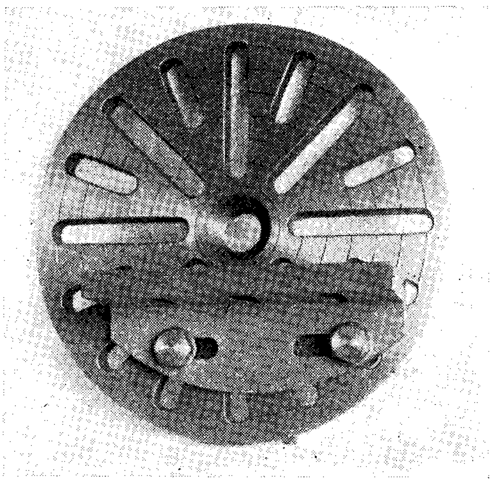
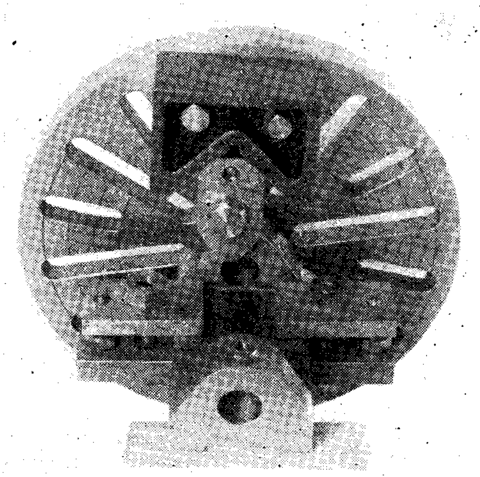


Fig. 2. The Myford special angle-plate



A casting mounted on an angle-plate attached to the faceplate

The outer drill hole can be machined with an ordinary boring tool and, at the same time, a facing cut is taken to machine the surface of the casting square with the axis of the bearings.

The inner drill hole will, however, have to be bored with a long boring bar mounted in the toolpost, and only light cuts must be taken to prevent springing of the tool.

The Keats V-angle Plate

A useful fitting for mounting on the faceplate is the Keats V-angle plate, illustrated in Fig. 4.

This appliance is made in several sizes suitable for large or small lathes. The base of the fitting is secured to the faceplate by four bolts, and the work, when placed in the V-trough, is firmly held by means of the special clamp provided.

When carrying out repetition work on a batch of similar components, once the first part has been centred, the remainder can be accurately aligned by merely releasing and again tightening the clamp. This clamp is made reversible to afford a wide gripping range. In Fig. 5, a bearing bush is shown centrally mounted in the angle-plate for machining the bore, and this operation can be accurately repeated, provided that all the components are of equal overall diameter.

The V-angle plate also serves for holding work on the table of the drilling machine ; for when the appliance rests on its base, parts clamped in the V-trough will stand vertically. Moreover, cylindrical work can be held horizontally when the angle-plate rests on its machined under-surface.

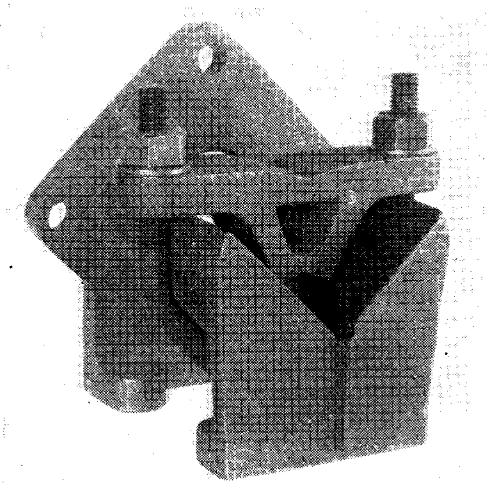


Fig. 4. The Keats V-angle plate

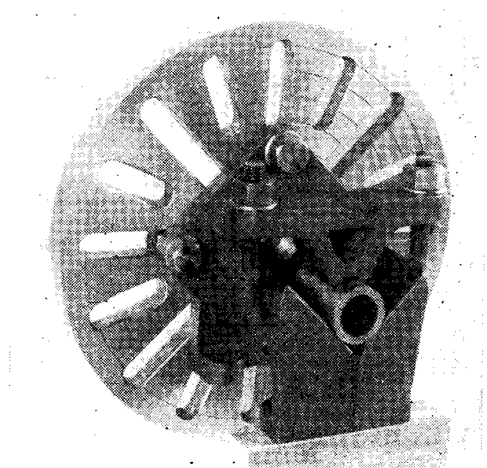
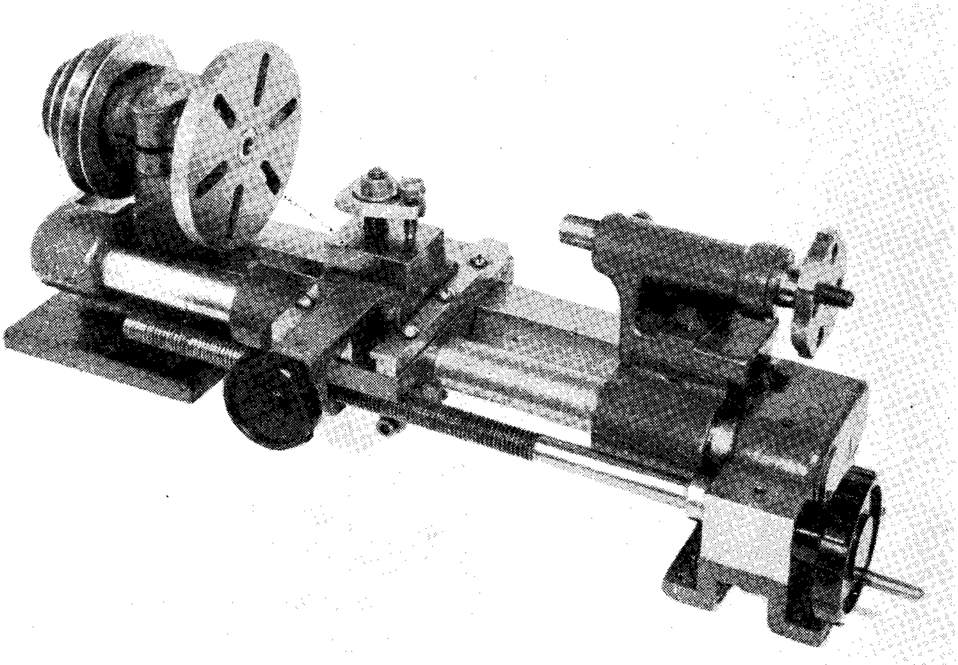


Fig. 5. Machining a bush in the V-angle plate

THE BIDEX $2\frac{1}{8}$-in. LATHE



The Bidex lathe, obtainable either finished or in the form of castings

IT is not often that the intending purchaser has the option of buying his lathe in the finished state, or as a set of castings. We have recently had the opportunity of examining a finished machine and also a set of castings for its manufacture, submitted by British Industrial Designers, and known as the Bidex lathe. The accompanying photograph shows the salient points of design, the bed consisting of a 1 in. dia. round steel bar in front and a 1 in. square section steel bar at the rear, each let into machined sockets and secured by Allen screws. A large area of support has been provided in the saddle, which is operated through a solid nut by a $\frac{1}{2}$ in. dia. × 12 t.p.i. leadscrew running in a single bearing of $1\frac{1}{2}$ in. length at the tailstock end. The cross-slide, which is not capable of swivelling, is also made up from castings, and slides in square ways, which, like all other sliding surfaces, are adjustable for wear. A criticism here is that the cross-slide ways are "open" and not protected in any way from swarf. Provision is made for up to $\frac{1}{2}$ in. "set-over" on the tailstock for taper turning, but no really positive form of lock is fitted to prevent loss of centre alignment when the clamp-nut is slackened and the tailstock moved along the bed.

This minor deficiency, however, could quite easily be rectified by very small detail modifications, entailing no alteration of the castings, and could, therefore, be incorporated by constructors. It would not be so easy to add a swivelling top-slide for taper turning, but this could be done by substituting, on the present saddle, a fully compound slide-rest in place of the single cross-slide.

The headstock has a single half-split bearing, housing a phosphor-bronze bush approximately $1\frac{7}{8}$ in. in length, and is fitted with a hollow mandrel of $\frac{3}{4}$ in. dia. which will pass $\frac{1}{4}$ in. dia. stock. No. 0 Morse taper centres are fitted and the distance between centres of the lathe illustrated was $6\frac{1}{2}$ in. approximately.

The castings submitted appeared to be of good quality, and included the basis of a three-point fixed steady. It must be stated that access to a large milling machine or lathe is necessary for the machining of at least the headstock casting, which alone measures $5\frac{5}{8}$ in. from the base.

The Bidex lathe can be obtained in castings or finished form, with extra length of bed if required, and a range of accessories is available. Readers may obtain further particulars from the makers, British Industrial Designers, Cavendish Chambers, Keighley, Yorkshire.

PRACTICAL LETTERS

Machining a Cam

DEAR SIR,—If your correspondent (W.B., Upton-on-Severn, Query No. 9941) will communicate with me, I would be pleased to loan him the jig for machining the cam for the "M.E." projector, also the "M.E." instructions by "Kinemette," and cams partly finished.

I am an engineer by trade, and have built the projector; I think the cam, and method of construction, a real good job. I made one or two modifications and fitted a cooler blower, which I consider was really necessary.

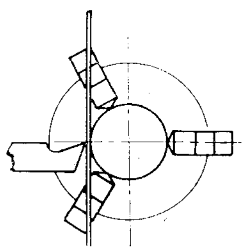
56, Calbourne Road, Balham, S.W.12.

Yours faithfully,
B. E. SIMPSON.

Tool Height Gauges

DEAR SIR,—On more than one occasion, articles have appeared in THE MODEL ENGINEER with instructions for making tool-height gauges.

These articles usually stress the importance of the lathe tool being at correct centre height if accurate work is to be done, but apart from pointing out the difficulty of accurately setting the tool by means of the lathe centres, rarely mention any other method.



I have never used a height-gauge for tool setting, but continue to use a method I was shown years ago, and get equally accurate setting, the only "tool" required being a piece of brass about $\frac{1}{2}$ in. wide, $\frac{1}{16}$ in. thick and 3 in. or 4 in. long, and the work-piece in the chuck itself.

All that is necessary is to hold this piece of brass vertically against the work-piece and run the lathe tool up to it, by means of the top-slide, sufficiently hard to hold it in place

A glance at it from the tailstock end will show if it is vertical or not. If necessary, a square stood on the top-slide or lathe bed will prove it. If the brass is vertical the tool is at centre height, if the top points to the left it is low, if to the right, high.

Maybe other model engineers use this method, or for some reason condemn it.

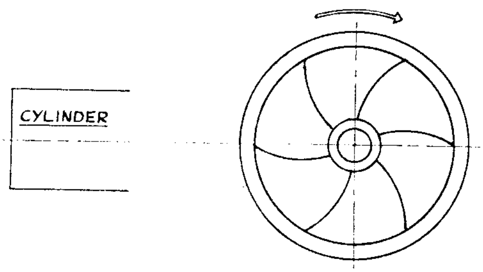
Yours faithfully,
Parkstone. A. DOUGLAS MATE.

Curved Flywheel Spokes

DEAR SIR,—Curved spokes always remind me of my first expedition to "dial up" a gas engine. I learned then that it ran "oot the hoose." Why exactly wasn't told me, but the term meant that viewed from the cylinder end the top of the flywheels travelled away from you. The spokes of the wheels were curved and the wheels were fitted. (See sketch.)

Many engines of all sorts have been dialled-up since and I have never seen a curved wheel fitted in reverse fashion or an engine with opposite rotation. This universal rotation of "oot the hoose" gradually dawned on me and ultimately it struck me that the only feasible reason for it was to have the reaction of the power stroke downwards at the cylinder—reverse rotation would have the engine trying to climb round the crankshaft, to counter which would mean an otherwise useless extension of the bed beyond the crankshaft centre.

The reason of these spokes curving radially



from the hub, with the inside of the curve towards direction of rotation, I ultimately resolved to my own satisfaction as being to ensure that the major stress in working (during the power stroke) would apply a compressive stress in the spokes. If fitted reverse fashion, the deliberately large inertia of the flywheel rim would provide a tension in the spokes for which short-grained cast-iron is hardly suited.

I have seen some really heavy flywheels with straight spokes but these spokes have been strengthened by triangulation; they have been more or less tapered in section from the hub to the rim.

Now, while engines I have seen have had the curved wheel fitted as above, it is interesting to note that the small "Ideal" engine by Hardy & Padmore (shown as *circa* 1890 on page 403, March 23rd, 1950) is not so fitted—but more intriguing is the fact that the same engine was advertised in 1902 fitted, shall we say "correctly." Did any spokes fracture between these dates? The only other exception to "correct" fitting I can bring to mind is the Stuart 800 by N. S. Norway on pages 93-94, January, 1949. The 800 in Stuart's catalogue is "correct." Is Mr. Norway running "in the hoose" and does he "incline to climb" when running up or pulling hard.

I have an old catalogue dated 1894 and the "FACILE Petroleum Oil Engine" shown ha "correct" flywheels.

What have those who made and fitted curved spoke wheels to say about it?

Yours faithfully,
Larkhall. A. W. PATE.

Electronic Organs

DEAR SIR,—With regard to Mr. Siddons' proposal to build an electronic organ, he cannot do better than take the famous advice to young persons about to marry—Don't! Unless he is well up in audio frequency circuitry, has a sound knowledge of acoustical theory, understands the general principles of organ design, and has mechanical skill well above average, his chances of getting away with it are slim indeed.

If, however, his heart is set on this project, I suggest that he start by reading the articles in *Electronic Engineering* for June and October, 1951, which describe the Compton Electrone and the Hammond electric organ. These articles will give him an idea of what he is up against. For help on the acoustical and musical side, I commend him to Sir James Jeans *Science and Music*, which is well worth reading in any case. If, at this point, he decides to go on, I suggest a visit to that wonderful storehouse of information the Patent Office library.

He could, of course, make a simple device in which each note is a pure tone. This would require few valves, etc., and be quite easy to make. It would, however, make a dismal row and would hardly justify the nomenclature of organ.

Mr. Oxley's letter sheds little light on the subject and confuses rather than helps the issue. His classification does not include the Compton "Electrone," probably the best of all electronic organs, unless his reference to the one "now used by the B.B.C." means the Electrone. If it does, I would point out that the Electrone has rotary electrostatic generators and does not use glass discs, photo cells, etc. Incidentally, the B.B.C. theatre organ in the late-lamented St. George's Hall had an electrone extension.

Nor do I see any future in his proposed use of a harmonium as a basis for experiment. I am no expert on harmoniums (or is it harmonia?) but I believe these inventions of the devil have a set of *brass reeds* and are, therefore, a total loss for magnetic methods. The electrostatic method needs high polarising voltages and is far too tricky generally. But why all this messing about? If Mr. Siddons wants to reproduce the vibration of harmonium reeds, all he need do is to shove a microphone in the case, couple it up (through a suitable transformer) to the "gram" sockets of the domestic radio and there is his electronic organ, or at any rate, as near to it as he is likely to get!

The only part of Mr. Oxley's letter which is practical politics is playing the harmonium in the street, and even there I consider that he should play it outside the "local" *before* he starts on his organ, so that he can build up a fund to launch the project with a sound financial backing.

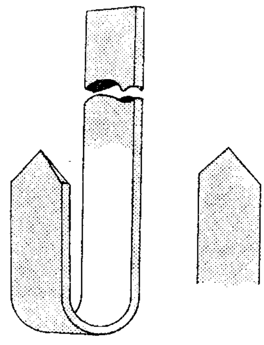
If, in spite of good advice to the contrary, Mr. Siddons does start on this organ, I wish him the very best of luck in a very difficult undertaking. After all, model engineers rush in where angels fear to tread, and they mostly get away with it! And, finally, if only I had enough time and money, which, alas, I have not, I would just love to have a bash at this fascinating job myself.

Yours faithfully,

New Eltham. A. L. HUTTON.

Drill Grinding

DEAR SIR,—After reading all the articles on drill grinding, I think I ought to tell you of a little gadget I use. When grinding drills which are anything up to 2 in. dia., I measure the cutting edges to keep them equal. This doesn't guarantee the point being central, so I made the following tool from a strip of steel $\frac{3}{4}$ in. wide, $\frac{1}{8}$ in. thick, 18 in. long. One end is ground to a point and then turned round, as in sketch (*A*). The inside face is either whitewashed or chalked. All taper



(*A*) (*B*)

shank drills have a centre hole in the tang and this is placed on the point. One side of the cutting edge is placed on chalk face and rotated slightly scribing a line. Next give the drill a half turn and bring the other side in contact and scribe another line. With both cutting edges equal length and the point central, the two scribed lines should show as one single line. When two lines show and the cutting are equal length, the point is not central, as in sketch (*B*).

Yours faithfully,

Sheffield. R. BENNETT.

Model Speed Boats

DEAR SIR,—May I be allowed to set down a few reflections on the subject of model marine engineering, inspired by the recent admirable articles on the record-breaking *Sparky II* and the results of the speed boat competition? Let me say at once that as I work among real ships I grieve to see the shape things are taking now, and await with trepidation the shapes yet to come! This is not to belittle Mr. Lines's efforts; he has done an excellent job of producing a mechanism conforming to a given set of rules and having a higher performance than other similarly-produced mechanisms. *Sparky II* certainly has *power*, but is surely not a *model*, at anyrate of a *boat*.

As a trend appears to be indicated here which may result eventually in killing this branch of the hobby, would it not be a good idea to require entrants for the speed competition to make a preliminary free run of, say, 60 yards at, say, 15 knots, to prove both their stability and the flexibility of their power plant?

A simple calculation will show that *Sparky II* at full speed experiences a reduction in displacement, due to the vertical inclination of the tethering wire, of about 13 oz. This is, of course, due in the first place to the efforts of the engine,

but were it not for the wire a greater proportion of the propeller thrust would be required to achieve the planing position, and, therefore, the speed would be reduced. On the other hand, if the restraint of the wire were removed the speed would perhaps increase. This point *may* be proved if the boats ever follow the example of the cars and leave the poles for guided courses other than circular.

Being a lover of steam I would be greatly interested to know how the fuel consumption of *Vesta II* compares with that of *Sparky II*. Undoubtedly it will be greater, and the lower performance of the steamer must be due to the boiler,which cannot transmit the heat to the water fast enough. The problem is one of heat transmission, and as it appears difficult to increase the heating surface on the score of height, it may be necessary to burn the fuel at pressures higher than atmospheric. Perhaps we shall one day see a free-piston petrol engine used in a steam boat to provide high temperature gases.

I doubt, however, if we shall ever see a steam plant of equal power which could be squeezed into *Sparky II's* hull!

I look forward to seeing more space devoted to marine matters, as even the same articles would not seem the same if read in another magazine.

Yours faithfully,

Newcastle-on-Tyne. T. W. LIDDELL.

CLUB ANNOUNCEMENTS

The Model Engineers' Society (Northern Ireland)

The above society has recently enjoyed two very good meetings. For the first we are much indebted to Messrs. C. C. Wakefield for the loan of their two technicolour films of all the car and motor-cycle races of 1951, especially those of the Dundrod and Clady circuits. Our thanks go to Mr. Dawson who went to great trouble to bring his equipment for the show, and a most enjoyable evening was had by members and friends alike.

Our usual monthly meeting was held recently when we had a very lively discussion on track design and building, also Mr. Birch's 3½-in. gauge " Juliet " which is a very commendable effort for a first-timer.

We would also like to issue a very hearty welcome to any of our overseas visitors who are likely to be over here during the summer on holidays. Room 6, C.I.M.S., Donegall Square, East Belfast, N.1, first Thursday in every month.

Hon. Secretary : J. LAZENBATT, 73, Westland Bungalows, Belfast.

The Chelmsford Society of Model Engineers

The above society and the Chelmsford Model Aircraft Club are holding another of their popular four-day exhibitions, from Wednesday, June 4th to Saturday, June 7th, in the Territorial Drill Hall, London Road, Chelmsford.

The schedule is an attractive one, divided into 18 classes, all of which are open, and in addition the East Anglia Challenge Cup competition will once again be held ; with the added attraction that this year there will be two cups, it having been decided to put up a separate one in the aircraft sections.

This competition is open to any individual entrant who is a bona-fide member of any society or club in the East Anglia area, and the winner of either cup will be adjudged by independent judges to have entered the outstanding model in the exhibition and will be awarded a silver medal as a permanent souvenir.

Particulars and entry forms are being forwarded to many secretaries of clubs in the vicinity, but some may have been inadvertently missed by the secretary. If so, he will be pleased to hear from them with a view to adding their names to his mailing list. Offers of models of interest, on loan, will also be greatly appreciated.

Hon. Secretary : DOUGLAS T. WYATT, " St. Helens," 18, Hillside Grove, Chelmsford.

International Radio Controlled Models Society

London Group. Sunday, May 11th, at 2 p.m., at the Horseshoe Hotel, Tottenham Court Road. Mr. J. C. Hogg will speak on " Radio-controlled Sailing Boats."

Tyneside Group. Friday, May 30th, at 7.30 p.m., at 176, Westgate Road, Newcastle-on-Tyne. There will be a discussion on dual control (simultaneous control of two models).

An International Radio Controlled Model Boats Contest will be held on Saturday, August 16th, 1952, at Stanley Park, Blackpool, Lancs. It will be similar to the contest held at Fleetwood last year, and there will again be separate classes for power boats and sailing boats, and a class for boats with rudder control only, worked by escapement.

An International Radio Controlled Model Aircraft Contest will be held at the same place on Sunday, August 17th, 1952.

Both these contests are open to anyone from this country or from overseas. Further details can be obtained from the Hon. Secretary, C. H. LINDSEY, 292, Bramhall Lane South, Bramhall, Stockport, Cheshire.

The North Staffs. Models Society

The society has now arranged a most comprehensive programme for the next twelve months covering indoor and outdoor activities. It is hoped to make good use of the 60 ft. of three-gauge portable locomotive track now completed and to extend this from time to time, and to develop the yachting and power boat sections.

Interests range over radio control, watch repairing, precision casting, model making with simple tools, and many other subjects.

The society could still admit a few more members. Excellent facilities are available including a fine stretch of water for the boat enthusiasts.

The society meets at the Arts Centre, The Brampton, Newcastle, Staffs, at 7.30 p.m., on first Wednesday and third Monday in each month. Visitors are welcome.

Hon. Secretary : A. S. HUME, Rydal Mount, 21, Quarry Road, Hartshill, Stoke-on-Trent.

Bishop Auckland and District Society of Model and Experimental Engineers

This society would like to make known to any model engineers in this area who are not members of the club and who may not yet know of its existence, that we would be very pleased to welcome them at any of our meetings held each Wednesday at the clubroom, Wear Valley Garage, Union Street, Bishop Auckland.

This club has started on a very ambitious scheme on the Woodhouse Close Estate, on land granted by the local council. This includes a multi-gauge locomotive track of 1,100 ft., roughly pear-shaped, model car track and, eventually, a large boating lake, which will be constructed by the council. Already, 200 ft. of concrete has been erected for the locomotive track and it is hoped to have several hundred feet more, complete with rails, during the coming summer.

Hon. Secretary : L. FINLAY, 7, High Seymour Street, Bishop Auckland.

Newton Abbot and District Model Engineering Society

The society's multi-gauge railway track is nearing completion, and it is now possible to travel the complete 400 ft. circuit. A start has been made on the construction of a 70 ft. diameter car track.

During the winter session we have been entertained with lectures, a junk sale and a technical film show each month.

We have a " Princess Marina " and a " Juliet " completed and a " Hielan Lassie " undergoing steam trials. Another " Lassie " and two " Doris's " are well on the way to completion. There are also several other locomotives being built as well as race cars, traction engines, and ships, etc. In fact, it is worth recording that, starting four years ago with about half-a-dozen models of sorts, the society could muster about 30 models finished and partly finished for exhibition if required.

During April, the end of the fourth year was celebrated by a supper held at the society's headquarters, the Penguin Inn, and was followed by a film show.

The president, Mr. N. P. Roberts, introduced Mr. H. J. Cooper, who had previously been invited to become the society's first vice-president. This being in line with a policy to invite influential men in the district representing the varied interests catered for by the society, to become vice-presidents.

Hon. Secretary : D. KNELL, 9B, Pinewood Road, Milber, Newton Abbot.